DISCOVERY BOOKS

Edited by John Hampden and Freda Holmdahl

BEHIND THE CINEMA SCREEN

No. 5

acking shot” in a B.I.P. studio. Note the “*dolley*” on e left and the extending arm of the microphone on the ght (page 21).

BEHIND THE INEMA SCREEN

by

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and from drawings by
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INTRODUCTION

THOSE who are engaged in the making of motion pictures are in the difficult position of having to try to please everybody at the same time. It costs much more to make a picture than it does to stage a play, therefore the picture must be of a kind which will appeal to large audiences. But the bigger the audiences, the harder it is to please every one in them. Consequently picture producers get more brickbats hurled at them than do any other people catering for the public's entertainment.

The talking picture is the newest of all the arts. Sculpture, painting, architecture, literature, and the drama have had centuries in which to develop, but the talking picture has had only a few years. Producers are still learning, making mistakes, and gaining experience.

The talking picture is also one of the most difficult of the arts, because it is really a combination of many. Successful results depend upon the capable work of a small army of people, all of whom are clever in their own sphere, but who cannot be expected to know everything about the work of all their colleagues. Music, sound, the drama, a specialized type of acting, photography, art, engineering, and electricity—all these, and several other widely different interests, must be combined to make a film.

In the following pages I have tried to give some idea of the tremendous amount of effort that this involves.

It would have been impossible to have completed this book without the kind and willing co-operation of many people actively engaged in the film industry, and I wish to thank Miss Sybil Sutherland of British International Pictures, Mr. H. Findlay, Mr. L. A. Lewis and Mr. P. W. Clarke of the Gaumont-British Corporation, Miss A. Mary Field and Mr. H. Bruce Woolfe of British Instructional Films, Mr. F. Percy Smith who makes the *Secrets of Nature* films, and Mr. Robb Lawson of the United Artists Corporation, all of whom have given me valuable assistance and advice on various occasions.

BEHIND THE CINEMA SCREEN

CHAPTER I

FROM SCRIPT TO SHOOTING

A MAN is sitting on the top of a step-ladder. He has a wad of papers in his lap. His elbows are resting on his knees, and his chin is cupped in the palm of his hand. A trilby hat is tilted on to the back of his head, and he sucks noisily at an empty pipe. His eyes have a far-away look.

He is a film director, and this is the first morning of production. The studio is filled with people. A few who talk together in little groups are smartly dressed and have brown complexions that suggest that they have just come back from a pleasure cruise. They have not, for the tan is artificial. These are players made up for their parts.

The players are greatly outnumbered by a bustling crowd of other workers. There are girls in plain overalls, and men with their coats off and their sleeves rolled up. One young fellow who stands in the middle of the floor with his hands on his hips is dressed in a dirty sweater, antique flannels, and worn tennis shoes. He looks like a scene shifter, but is actually one of the director's most valued assistants.

In one place men are pushing furniture about. In another electricians are unrolling cables across the floor.

The director comes out of his reverie.

" Props ! " he shouts.

A man in a green apron pops up from nowhere. He is the property man.

" Yessir."

" There ought to be a cake on that tea-table. An iced cake."

" Yessir."

Props disappears like a djinn out of the *Arabian Nights*, and comes back almost at once with the cake.

" Mind your backs, please ! " yells some one.

Two young men are wheeling a camera into position. It trundles along like a juggernaut, narrowly avoiding a crash with the step-ladder.

" Props ! " it is the assistant-director this time.

" Yessir ? "

" Get a few tacks and nail down the corner of this carpet, or some one will be falling over it and breaking his neck."

" Yessir."

The green apron does its celebrated vanishing trick. Meanwhile the camera chief has been squinting through his view-finder. He turns to the director with a look of grief.

" That mirror over there. We'll have to move it. It throws a reflection into the lens."

" But we can't do that, old man. It's in the script. It's the most dramatic incident in the scene, where Harry looks in the mirror and sees something going on behind his back. If we move the mirror we shall have to rearrange the whole set. Try altering the lighting."

" Right ! "

Gradually order takes shape out of chaos. The director climbs off his perch and calls the players together.

" Let's just have a run through this thing," he suggests. " Where's Harry ? "

" Here I am ! "

With a wad of typescript in his hand the leading actor pops up from behind a sofa, where he has been sitting on the floor, quietly conning his lines.

" Are we all ready then ? "

There is a succession of nods and smiles. It seems that everything is in order, and a start can be made. Then the expectant hush is shattered by the plaintive voice of the red-faced camera chief.

" It's not a bit of use. You'll have to move that mirror ! "

When you go to the cinema and see a film you like, naturally enough you give all the credit to the actors. You say that they gave a good performance. But to make that film a success many other people who are never seen on the screen also had to give a good performance. Out of range of the camera's lens there are dozens of people—hard workers, experts at their own particular job—who play a vital part in production: directors, authors, scenario writers, camera-men, costume designers, property carpenters, painters, make-up experts, sound technicians, musicians, lighting experts, engineers, cutters, and so on.

A full-length film runs for about seventy minutes, yet it may have been three months in the making, and probably cost £50,000. What was going on in the studio all that time? Where did all the money go?

The first thing to be done with a story destined for the screen is to boil it down to a Synopsis of about five hundred words. The Synopsis is next elaborated into a Treatment, with more detail. The Treatment is passed over to the scenario writers, who have the hardest task of all. They have to think in terms of pictures. Everything is worked out exactly as it is to appear on the screen; all the shots are described, and the dialogue and the sound effects are written up—no light task, for there will be between four hundred and five hundred shots in a full-length picture, and each one must be thoroughly planned before the picture goes into production.

A difficulty which often presents itself when preparing the dialogue, especially in comedies, is that of allowing for laughter from the audience which may drown the next speech. On the stage actors can make their own arrangements about this, according to the way in which the audience behaves, but in writing a film script it is largely a matter of guess-work. Often a slight pause, or a sequence of silent action, is worked in; but if this allows for a long, uproarious laugh, and the audience only responds with short chuckles, or does not laugh at all, the quiet section no longer serves a useful purpose. In fact it may have a definitely bad effect by holding up the story unnecessarily.

One method of solving this problem is to arrange a secret "try-out." The picture is added to a cinema programme unannounced, and careful note is taken of the attitude of the audience, so that any alterations found necessary may be made before the picture is officially released to the public.

When a film version of a stage play is being made another method may be employed. A complete gramophone record of the performance in the theatre is made—not only the play itself, but the sounds from the audience being recorded—so that the length of each laugh can be measured. The discs cost about £10 each, and thirty of them are required to record an entire play.

But although the records do provide a foundation for the director to work on, they do not form an absolutely accurate guide, for no two audiences behave in exactly the same manner. A joke which causes a riot of laughter in Manchester may evoke only quiet smiles in the West End of London.

This is only one of many problems which Scenario and Treatment writers have to face, whether working on an original story or an adaptation from a play or a novel, and one reason why a film version of a well-known novel sometimes comes in for a good deal of criticism is that people do not realize these problems. A novel is quite a different thing from a film, and must be adapted before it can appear on the screen. For example, nearly every author side-tracks his narrative at times and goes into details that are not vital to the plot; but as a film runs for only seventy minutes there is no time for anything but the main story. There are many incidents which make interesting reading but are dull when translated into pictures. Other scenes may be too difficult, too expensive, or too dangerous; they may call for too elaborate sets, or take up more production time than they are worth.

Again, when important actors are engaged for leading parts every effort is made to give them as much limelight as possible, and if the characters that they are portraying do not provide them with enough to do, the scenario writer alters the story, either by cutting out incidents in which other characters play a big part, or by putting in new scenes of his own invention to give the leading actors more scope. Whether you think this is a good way or a bad one of treating a novel depends on whether you go to the cinema to see your favourite actors or to see a true rendering of the story.

The director is just as reluctant as anybody else to see a good story mutilated, but there are many things that he cannot afford to do, and there is a limit to the amount of money he can spend. Before they condemn, critics should remember that unless they were financially profitable we could not have films at all.

Every film, then, is worked out in detail on paper first. After the scenario has been written, a conference of all the heads of departments is held. Together they plan the final details of action, dialogue, and scenery, and a thick wad of typewritten pages is the result of their efforts. This is called the script. Each department receives a copy of it. It is the final word. Once the script is finished and the picture goes into production, nothing can be altered.

Some producing companies divide their scripts into two columns, the left-hand column describing the action, and the right-hand column carrying the dialogue and sound effects, but all producers do not favour this method ; some prefer to keep action and sound together.

"The Good Companions"

Here, for example, is an extract from the script of the Gaumont-British production of *The Good Companions.*

This story, based on J. B. Priestley's famous novel of the same name, follows the fortunes of a theatrical touring company. One night, when an impresario has come from London specially to watch the heroine's performance, a rival manager hires a gang of toughs to wreck the show. The sequence given below illustrates how a rapid series of shots, introducing the characters one by one, builds up suspense and leads to the big rioting scene which is the climax of this section :

Scene 109 INTERIOR OF AUDITORIUM.
The house filling up.
110 OUTSIDE THE THEATRE.
We see a Rolls-Royce arrive outside the theatre. Monty Mortimer gets out.
111 VESTIBULE OF THE THEATRE.
Ridvers is exchanging a look with several rough-looking customers, but not, of course, rough enough to be refused admittance.

Ridvers walks towards the entrance and moves out.

112 SIDE OF THE THEATRE. EXTERIOR.

A doorway with the word "Circle" in lights.

Ridvers walks in, and several other toughs go in. He nods to them.

113 INTERIOR OF THE THEATRE.

Monty Mortimer threading his way through the audience to his seat.

114 PROMPT CORNER ON THE STAGE.

Susie looking through the spy-hole at the audience. Reaction as she sees Monty Mortimer. Without taking her eyes away from the spy-hole, she motions to anybody near her.

Susie. I say—I say—look who's here.

We see that Inigo is nearest to her.

Susie (*still staring through the spy-hole*). I say, it's Monty Mortimer himself. What's brought him here ?

Susie turns and sees Inigo near her. They look at each other. Susie begins to realize.

Inigo. Monty's my birthday present to you.

Susie. Do you mean to say that . . .

Inigo. Yes, I . . .

Susie just looks at him, unable to say or do anything. She is completely overwhelmed.

115 THE BAR OF THE THEATRE, GATFORD.

Ridvers is there drinking, and a few of the toughs are with him.

Barmaid. Pretty busy to-night.

Ridvers. Busy all right. (*He winks at the others.*)

116 BACK OF THE STAGE.

Susie is kissing Inigo. They break away as Jesse Oakroyd comes up, and Jimmy is shouting, " Start the Overture."

Inigo flies off. Susie turns to Jesse.

Etc., etc.

Throughout the shooting of a film a girl known as the Floor Secretary or Continuity Girl sits beside the director with a copy of the script, and takes note of everything that occurs. Any tiny deviation from the typed scenario must be recorded. If the shooting of a sequence takes more than one day, it is the floor secretary's job to see that nothing is altered overnight, that none of the properties are shifted, that the actors appear on the second day dressed exactly as they were on the first day, and so forth.

At the end of each day's work the floor secretary prepares a record of what has been done. This is called a *Continuity Sheet*, and is for the guidance of the editor who will finally assemble the film in its finished form.

Casting and making Sets

As soon as the script has been prepared the casting director is given a list of the players required. It is usual to decide, when the story is bought, who is going to play the leading parts, but the casting director is responsible for engaging the actors for smaller parts and crowd scenes. He has classified records of every type of actor and actress, with notes on their height, colouring, appearance, parts they have played, address, telephone number, etc., and if he is asked to supply a crowd of people for a railway station scene, including about thirty assorted types to walk across the set, together with a porter with a raucous voice, a ticket collector, a pompous old gentleman, a fussy old lady, a pair of lovers, a nurse with two children, and a cockney newspaper boy, he can turn to his files and get into touch with all the people he wants at very short notice.

He is always being pestered by people who think they are born actors, and who demand a chance to appear on the films. Screen tests are arranged for the more promising ones, but even then nineteen out of twenty fail even to get themselves accepted for inclusion in the files for crowd parts.

Other departments also come into operation as soon as they receive their copy of the script. The wardrobe department begins work on the dresses. The designers have to be authorities on details of costume for any period and any country, and they have to know which colours photograph best, and what kind of dress will most enhance the appearance of the player who is to wear it. The art department begins to design the sets. Here again a good deal of research may be necessary, since anything from a Japanese tea-garden to an ultra-modern office with steel furniture may be asked for.

Like the dress designer, the art director needs a good colour sense and a thorough knowledge of photography. Copies of the script go also to the carpenters, the scene painters, the property makers, the publicity department which sends out advance news to the newspapers, and so forth, and these too must begin work at once.

Meanwhile a time-table is prepared from the script, a task which needs careful handling if needless expense is to be saved. All scenes which use the same set are grouped together, so that they may be shot one after the other. If the first and the last scenes occur in the same room, and the intervening scenes elsewhere, then the first and last scenes are taken together. No attempt is made to film the story straight through; it is made bit by bit, or, more plainly, set by set. In this regard acting for the films is more difficult than acting on the stage, where the player goes straight through the story from beginning to end. A film actor may begin his day's work by doing a short piece from the middle of the story, go on to a thrilling portion at the climax, and finally come back to a quiet incident near the beginning.

When the sequences have been grouped together, the next step is to decide which sets shall be built first. If highly-paid leading players are being specially engaged for the picture, every effort will be made so to arrange the schedule that they will not be kept for several days kicking their heels on the set and doing no work. If some particularly large sets—a big restaurant interior perhaps, or a dockside—are needed, and there is only one sound-stage large enough to hold such sets, the restaurant scenes must be done first, followed by sequences on smaller sets in other studios which will occupy the time of the company while the restaurant is taken down and the dockside put up.

Property carpenters can perform such feats with amazing rapidity. At their Shepherd's Bush studio the Gaumont-British Company erected, not long ago, a wonderful replica of a Paris railway station, the Gare de Lyon. As soon as the scenes had been photographed the carpenters and painters set to work, and in a day or two the place seemed miraculously transformed ; the railway station had vanished, and in its place was the wide deck of a battleship, complete with enormous 14-inch guns. It looked very real. And it was all made of ply-board and canvas !

Set-building is usually a costly business. One world-famous producing company uses a million feet of timber a year for this purpose, as well as eleven thousand rolls of wallpaper, and similar huge quantities of nails, paint, canvas, and other materials.

And there is practically no limit to the ingenuity that is brought to bear on the task. Almost anything can be built up on the studio floor and made to look like the real thing. In another film that was being made at Shepherd's Bush a banana plantation was required. The property chief went along to Kew Gardens and explained matters to the curator, who gave him three fourteen-foot banana leaves. These he took back to the studio, where as many replicas as necessary were made out of linen and cane, realistic tree-trunks were also built, and huge bunches of bananas to hang on the " trees " were obtained from Covent Garden. The banana grove was a great success !

Off the coast of California there is a Pacific island called Catalina, which has a hot, dry, sunny climate. In the middle of the hot season a Hollywood producer took a company there to make a picture called *Rain*. A tropical rainstorm, with thunder and lightning thrown in, was to form a background through the whole story—rain, rain, rain all the time. It was the property department's job to provide eight weeks of rain on a rainless island !

Pipes were laid down from the location camp to the Pacific Ocean, and electric pumps forced the sea-water up into an intricate network of overhead pipes that covered an area of several acres and could be regulated to provide any kind of rain, from a shower to a cloudburst. Aeroplane propellers were set up at various points on the sets in order to turn the falling water into wind-swept, driving rain.

To produce artificial lightning a big scissors-shaped apparatus was used. A powerful electric current was run through the scissors while the two arms were gradually opened out to a distance of eight feet, and as the spark between the two points flashed and lengthened it gave a perfect imitation of lightning.

Make-up

When the stage carpenters and technicians have finished their task, and the decorators and property men have set the scene, the time arrives to do a little preparatory work on the performers themselves: they have to be made-up.

Bad make-up can do a good deal of harm, especially in "close-ups," where it may photograph in flat white and crude black—"soot and whitewash," as the cameramen call it. To shoot a close-up, the lens of the camera comes within a few feet of the actor, whose face, when shown on the screen, may be magnified to about nine feet high. So make-up has to be done much more carefully for film work than on the stage.

For ordinary purposes make-up is now very light. Not so many years ago lavish use was made of blue, green, yellow, red, and purple paint to get natural effects; but now, thanks to improvements in photographic equipment and lighting, make-up for straightforward parts is done chiefly by dusting the face with a light brown powder and adding a little dark shading round the eyes. Even when seen at close range the effect is not unpleasing, since it merely gives the actor a strongly sunburnt appearance.

Making-up the face for a character part is quite another matter, demanding elaborate skill and care.

Some of the most painstaking make-up experts take a wax cast of the player's face and experiment on this until they have decided exactly what to do with the player himself.

One of the most spectacular feats in this art was accomplished in the screen version of Robert Louis Stevenson's story, *Doctor Jekyll and Mr. Hyde*, the story of a man who lived a double life. As Doctor Jekyll he was kindly and good, but at times he underwent a fearsome change into the villainous monster, Mr. Hyde.

In the film version the audience actually saw the change. The double part was played by a handsome young man, who was made-up in thirty successive stages. A few feet of film would be exposed, then the make-up expert would hurry on to the set and make some small alterations. A few more feet were exposed, the alterations were intensified, and so on. Much of the effect was secured by using successive pairs of ugly false teeth, increasing in size, each pair being slipped on over the previous ones. Stubbly hair was stuck on to the face to give an uncouth appearance. A special wax moulded over the nose made it look larger. Clever photography and the actor's facial contortions increased the effect; and the final result was that the handsome Dr. Jekyll appeared on the screen to change slowly and appallingly into a hideous criminal.

A coarse, pitted appearance is given by smearing on hot grease paint fairly thickly and then tapping a bristly stencil brush over it. Wrinkles are made by applying layers of fish skin and then covering them with grease paint. The effect of skin peeling after exposure to the sun can be obtained by painting with collodion, which goes flaky when it dries. Perspiration is faked by spraying the face with glycerine. The shape of a mouth can be altered with silver wire, placed in the corners. Noses and ears can be modelled into any desired shape with a special wax.

In a Chinese character the shape of the eyes is most important. They are elongated with thin strips of goldbeater's skin fixed to the lids and outer corners of the eyes, the skin is then covered with fish scales, and the make-up is completed by painting the scales with grease-paint.

Performers wearing elaborate make-ups may be engaged in a production which takes months to complete. Each day a new make-up has to be applied so that it looks exactly as it did the day before. Consequently a set of photographs are taken from various angles and the make-up artist uses these as guides.

To go on wearing an elaborate make-up day after day imposes great strain on an actor. Many disguises, through holding the features in unnatural positions, become very painful, causing the actor to suffer from headaches, eye-strain, blisters, and rash. At times they may even cause attacks of fever.

Ready to Shoot

When the players have been made-up they are ready to take the floor, having previously studied their parts from the script, and they know which scenes are to be shot, so that everything is in order for the rehearsals that precede the shooting.

After the rehearsals the cameras are wheeled into position ; then the lights begin to go on. They splutter a bit at first, and give an eerie blue glow that shudders queerly before settling down into a blazing white glare. Perhaps they have to be moved about a little to cut out some awkward shadows. The camera-man takes a last-minute squint through his view-finders to make sure that he has got everything into his " frame," and the assistant director shouts :

" Close the doors ! "

The padded sound-proof doors are locked. Red lights pop up in the corridors outside to warn people that they must not try to get in. Ready to shoot !

CHAPTER II

THE SHOOTING BEGINS

" QUIET, everybody ! Quiet, please ! "

The assistant director holds out his arms beseechingly as he stands in the middle of the cable-littered floor and casts a final approving glance at the make-believe world of ply-board and canvas that rises all about him.

The hubbub of noise dies to a tense hush. You can almost hear yourself breathing.

" O.K., cameras ? " demands the director.

" O.K. ! "

" O.K., sound ? "

There is a short pause while the operator up in the sound booth passes on a warning to his assistants in the recording room to start up their apparatus. Then the silence is shattered by a blare that makes you jump as his voice booms across the set from an amplifier.

" O.K. Shoot it ! "

" Start the action," commands the director as he flops into a chair beside his script girl

The cameras begin to work, silently. A young man walks in front of the camera and claps two pieces of wood together sharply. He dodges away, and another takes his place, holding up a blackboard on which is chalked

Letting in the Sunshine.

Scene 29. Take 1.

The action goes on, apparently quite successfully; but suddenly the director jumps to his feet.

"Cut! Cut!" he exclaims desperately.

The action stops, and the performers allow themselves to relax. One of the actresses hurriedly repairs her make-up where it has suffered from the heat.

"Somebody's shoes are squeaking," declares the director in an aggrieved voice.

The culprit is discovered. A new pair of shoes that do not squeak are sent for hastily. Every one goes back to his original position, and all the preliminary performance is gone through again. Once more comes the command:

"Start the action."

The clapper boy does his little act. The blackboard is hoisted up again:

Letting in the Sunshine.

Scene 29. Take 2.

Everything seems to be going beautifully this time. But wait. On the edge of the set a privileged visitor is striving desperately to stifle a tickling in his nose.

"Atishooo!"

"Cut!" bellows the director, going red at the gills.

That explosive sneeze has utterly ruined the second record. Every one turns a horrified stare in the direction of the offender, who is blushing furiously and looking ready to sink through the floor with shame.

Take Number Three gets under way, and runs through to the end without interruption.

" How's that for sound ? " calls the director.

" Mr. Burdon raises his voice too much towards the end, and seems to be getting too close to the mike," comes the reply from the sound booth. " Ask him to speak a little more quietly."

And so it goes on. Sometimes everything goes right at the very first attempt. At other times eight or a dozen " takes " may be necessary, and this goes far to explain the heavy costs of film production.

I remember one day when I arrived at the British International Pictures studio at Elstree, at eleven o'clock, and pottered about on one particular set until I left, some time between five o'clock and six. In that time only one scene had been shot : it was the opening scene of a film, and would take just *two minutes* to show on the screen !

Things do not always go so slowly as that—I have seen five or six scenes shot in the course of a single morning at times—but this scene (which appears in the frontispiece) was very complicated, for it not only needed much rehearsal, but had to be photographed a dozen times before the result was completely successful.

The camera and the microphone had to follow the leading actor backwards and forwards through three rooms, the camera being mounted on a wooden carriage with wheels which were rubber-tyred to deaden the noise. A set of this kind is termed a *honeycomb*, the carriage is called a *dolley*, and scenes taken in this way are known as *tracking shots*.

Tracking shots have to be accurately planned, because it is so easy for the actor to get out of focus, and they become still more difficult when the actor speaks while moving about, because the microphone, which is hung over the set on an extending arm, must also follow him.

For this particular scene the whole morning was spent in arranging the lighting to the best advantage, fixing up the furniture and fitting in the set, plotting out the position and actions of a dozen minor characters, and rehearsing. Little snags kept popping up just when everything seemed all right, as, for example, when the actor's movements had been timed to a nicety, only for the director to find that right at the end of the scene the microphone over his head threw a shadow on his face.

But by lunch-time all was ready, and the afternoon was spent in filming the scene. It was taken over and over again before the director and the sound expert were both satisfied with the result, and even then it had to be gone through once more, for one successful shot is never regarded as sufficient; another is always taken as a precaution. A shot which appears to be entirely satisfactory may reveal some hidden defect when it is tried out on the screen in the studio theatre, and to re-take shots at so late a stage might well prove an expensive business, involving the reconstruction of elaborate sets which have been demolished.

There is a little respite after each shot, while the director, technical experts, and leading players hold whispered conferences—a respite very welcome to all concerned, for the work is exhausting. The atmosphere becomes stifling at times, for the sound-proof studio is practically airtight, and the powerful batteries of lights heat the air until it is sweltering.

During the intervals a number of people are heard calling loudly for the chocolate boy, who strolls round the set with a tray of sweets slung across his shoulders. Smoking is forbidden in the studio, and people with a craving for tobacco nibble chocolate instead.

The need for re-taking a scene time after time imposes queer tests of fortitude on the actors. On one occasion a scene was being shot in which the actors had to make a hearty meal of sausages and mashed potatoes. It was real food, and it really was being eaten. The scene was shot again and again without satisfying the director, and at last one of the actors protested that he simply could not eat another sausage.

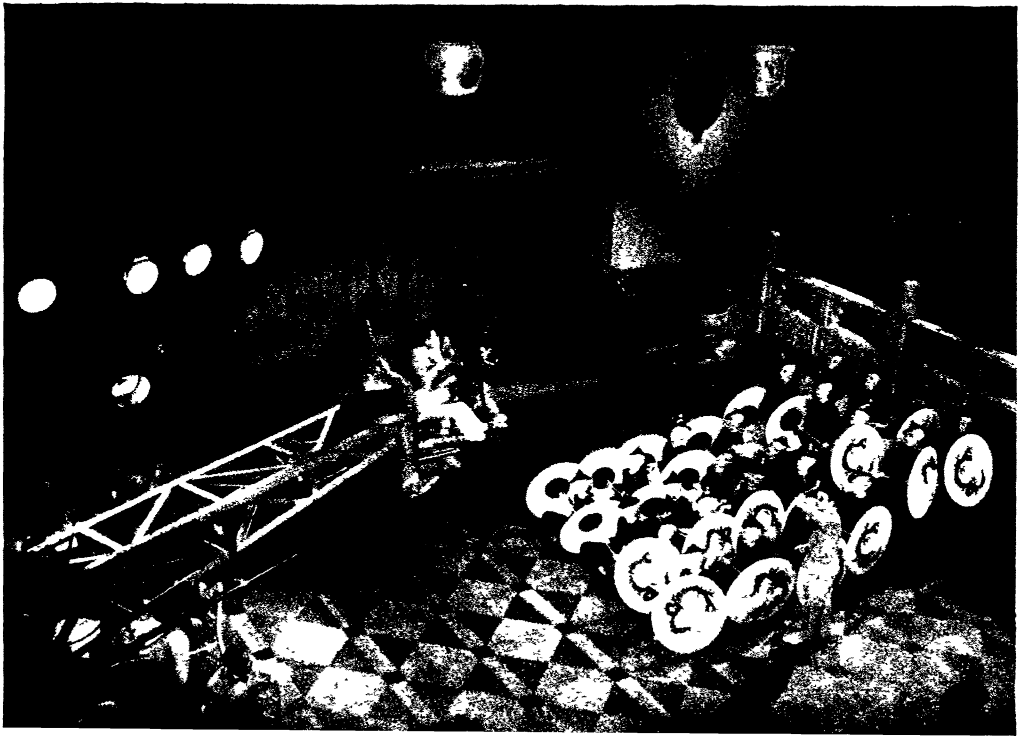
The director begged him to do just one more shot. Just one.

But the actor said no, he could not do it. He had eaten—oh, ever so many sausages, so many that he had quite lost count, and he simply could not find room for any more.

The director pondered this problem until he was struck by a bright idea.

" Well then, could you eat ice cream ? " he asked.

The actor thought he could, so the staff confectioner cleverly disguised some to look like " sausage and mash," and the situation was saved !



Sound Recording

When sound first took the film world by storm and twirled it head over heels, the directors thought that all they had to do was to add music, speech, and noises to the kind of pictures that they had been making before. But they soon discovered that they were wrong. Silent pictures were done in exaggerated dumb show. They were pantomimes. Sound altered all that. The film makers had to sweep their old ideas away and start over again from the beginning.

In the early days of talking pictures unexpected difficulties were constantly cropping up. Unlooked-for calamities spoiled whole reels of film, setting weeks of work at naught, and sending production costs sky-high. A terrible crackling that ruined early efforts at sound recording was traced to the Klieg lights, and it was necessary to invent a new type of electric bulb that did not set up this disturbance.

The old-fashioned cameras, too, clattered and clicked. This was first got over by enclosing the camera in a soundproof booth, with thick plate-glass windows. Operators frequently fainted in the booth from lack of air, and nothing but the most straightforward photography could be indulged in, because the camera could not be moved. Eventually a new type of noiseless camera was built which could work out in the open in the old way.

Early motion-picture cameras were worked by the operator turning a crank. Now an electric motor does the job. The film in a motion-picture camera runs at a standard speed of ninety feet a minute, and as one foot of film contains sixteen separate pictures, called *frames*, a camera makes twenty-four exposures a second.

The film in a motion-picture camera is a negative, as in a normal photographic camera. It is developed, and positive prints are made from it in the ordinary way. The camera does not record the sound, nor is the sound recorded on the film that is in the camera. Action and dialogue are recorded separately, and at this stage the picture film is termed a " mute."

There are several methods of recording sound, one of the best and most widely used being the Photophone method, which briefly is as follows :

One or more microphones are suspended over the set. A microphone is an instrument similar to a telephone mouthpiece, with the same function, that of turning into electric currents the waves in the air by which sounds are carried. These waves beat against a circular metal plate in the microphone, causing the plate to vibrate against a magnet which is part of an electric circuit, and as the plate beats against it circuits are continually being made and broken again.

Wires from the microphone carry the electric impulses up to the sound booth, where an operator sits at a control panel to check the volume of sound from each microphone. His booth is sound-proof, but he has a loudspeaker which enables him to hear everything happening on the set exactly as it would be heard by an audience in a theatre.

Much of the ultimate success of the picture depends on him, for nothing can ruin a picture so easily as badly recorded sound. The operator listens for clear diction. By turning the dials on his control panel he can make the words louder or softer. He keeps a close watch on the background sounds, such as orchestral accompaniment, or the shuffle of feet in a ballroom scene, or the clatter of typewriters in an office, in order to make sure that these noises do not become so loud as to swamp the dialogue.

From the sound-control booth the electric currents are carried to the recording-room, where they are *photographed.*

The currents are used to light a little lamp, and as the strength of the current varies with the movements of the disc in the microphone, so does the light of the lamp flutter up and down. Negative photographic film passes in front of the lamp at exactly the same speed as the film going through the camera—that is, at ninety feet a minute—and the fluttering light is photographed on the film as a jagged line. This is the sound track.

When the negative of the sound track and the negative of the picture have both been developed they are brought together, and a positive print is made of both of them on one film, in which the sound track appears as a narrow band running down the side of the " frames."

At this stage the film may be said to be complete, in so far as it can now be run through a projector and shown on a screen, with sound accompaniment complete. Actually, however, before reaching the public, it has many more stages to go through, in which nine-tenths of the film that has been exposed will be scrapped.

It will readily be understood that since the sound and the action are recorded on different films they need not be done together; the film can be made silently, and the sound effects can be added afterwards. This is frequently done.

All film-producing companies keep a library of all kinds of sounds. There one may find, ready for use at any time, strips of sound-film recording the noises made by all kinds of machinery, railway trains, motor cars, trams, speed boats, and so on; sounds of galloping horses, falling rain, wind, birds singing, and many others.

These may be used for background noises, or for noises off the set. For example, the picture on the screen may show a man sitting reading in front of the fire. Suddenly a sharp rap on the door is heard, although neither the door nor the person knocking is actually seen by the audience.

Such a scene would probably be made by taking a silent film of the actor sitting in the chair, and adding the knocking afterwards.

" Noises off," when properly used, can produce intensely dramatic effects by stimulating the imagination of the audience, but it is sometimes difficult for the sound expert to judge just how they will strike people. For instance, when a peaceful farm appears on the screen, will the quacking of a duck or the mooing of a cow increase the sentimental atmosphere which the director wants to create, or will it only make the audience laugh? Often it is very difficult to decide.

The sound expert has opportunities for producing little masterpieces of drama which would have been impossible in the days before talking pictures. Imagine a scene in which a number of people who are enemies are grouped in a room. Suddenly some one switches out the lights. The screen goes black. Now the sound expert revels in his art. He is able to produce a little drama entirely in sound.

Some one screams. A revolver cracks. There is confused shouting, followed by the trampling of feet. Gasps. A chair crashes over. A window is smashed.

All this time there is nothing to see on the screen, yet if the sound expert is skilful he will have every member of the audience gripping the sides of his seat with excitement.

The sound mixer gathers up the several different lengths of films on which the selected noises are recorded and puts them into separate machines, all connected to a control panel on his desk, so that he can start and stop them when he wishes, and can control their volume. Listening as his loud-speaker reproduces them, he weaves them cunningly into each other, and in the recording-room the finished sound effects are once again recorded on a single strip of film.

In a similar way background noises are added to an already existing sound track. In a scene showing two men talking in the wings of a theatre, or outside a ballroom, the actual dialogue would be recorded when the action was shot, but to make the thing completely realistic it is necessary to add a faint murmur of a chorus singing on the stage, or a band playing in the ballroom, as the case may be. So the film is shown on a screen, and the sound mixer, watching from his desk, starts up his background noises and blends them with the dialogue, taking care not to let them swamp it.

This process of adding sounds is termed *dubbing.*

In these days very few noises are faked. In the first year or two, when sound apparatus was in its experimental stage, this was often necessary, because all noises underwent a certain amount of distortion, so that a matchbox crumpled in the director's hand near a microphone gave a better impression of a motor-car accident than the real thing. But now the true sounds are usually the best.

A favourite yarn in one of the studios relates how the experts strove to get a record of a cricket chirruping. A number of these insects were collected and put in a box near the microphone; but they refused to make the slightest sound, and after two days of patient waiting a naturalist was consulted for advice.

"The cricket's chirrup is a call to its mate," he explained. "If you separate them into their sexes they will chirrup."

The sound expert rubbed his head in perplexity. How *does* one tell a lady cricket from a gentleman?

At last he had a fine idea. He put each insect into a separate box. The sound was deafening!

Outdoor Shots

In England, stories which require a lot of outdoor settings are not very much favoured, partly because of the difficulty of getting seclusion and freedom from unwanted noises. But that trouble can be got over if outdoor scenes are vital, and sound recording impossible, by filming the action silently and adding the sound by a complicated system of dubbing. Even dialogue can be dubbed if it cannot be recorded when the action is filmed. The silent film is shown in the studio, and the performers speak their lines into a microphone while watching the picture and synchronizing their words with the movement of their lips on the screen.

But the greatest enemy of outdoor film making in England is the weather. In the winter months, especially, conditions are so bad that practically no outdoor work can be done. While the company is wasting money in going out on location day after day in the hope of catching a gleam of sun, something just as good and realistic, in appearance at least, can be faked up in the studio by the property men.

On one occasion an outdoor set of a ship was built at Elstree for the purpose of filming a heavy storm at sea, with large overhead tanks to provide " rain," but just before the " shooting " began a real rainstorm started, and it lasted all through the scene. The faked storm was but a pitiful shower when compared with the real thing that functioned so obligingly.

The weather is not always so helpful as that, however. On another occasion, when some scenes at the Zoo were wanted, the company assembled at Elstree, where the weather was beautifully sunny, and set off hopefully for Regent's Park. When they got there it was so foggy that it was impossible to see a hand in front of one's face, and they waited all day in vain.

The next day the same thing happened. They left Elstree in sunny weather and arrived at Regent's Park to find the Zoo wrapped in a blanket of fog. After hanging about for some time the whole company went to have lunch. Half-way through the meal the fog suddenly lifted, and that lunch was never finished: there was a wild rush to get the scenes shot as quickly as possible in case the fog decided to come back and blot out everything.

Ordeals

One of the most exciting scenes ever shot in England was made at the Surrey Commercial Docks in the early, dark hours of a March morning. The scene depicted the sinking of a liner, and the vessel used was the Cunarder, *Alaunia.*

The climax of the scene arrived when a lifeboat, lowered from the sinking vessel and loaded with panic-stricken men and women, broke from the davits at one end and threw every one into the water. No women actually acted in this scene, men being dressed as women. It was a bitterly cold night, and most of the performers had been hanging about for several hours while other episodes were being shot, so that by the time their turn came they were chilled to the marrow.

The lifeboat was picked out with a couple of powerful spotlights. The players clambered into the boat, which began to be lowered, and no doubt they experienced a sinking sensation in more senses than one.

Woosh!

The davit rope broke, one end of the lifeboat crashed down with realistic violence, and the actors were hurled fifty feet into water that was ice-cold. Even when they reached the water their ordeal was not over, for they had to swim a hundred yards to a boat which was out of range of the camera.

The men who were made up as women had the hardest task, since they were dressed in the fashions of 1912, with long, voluminous skirts that hung to their feet and hampered the movement of their legs when they swam. Several of them were on the point of collapse when they were hauled into the boat. But the moment they were aboard the whole company were rushed off to hot baths, and no one felt any serious after-effects, although one man had a very narrow escape. He struck his head on a piece of driftwood when he fell into the water, and was in a half-dazed condition when dragged to safety.

Such ordeals are by no means rare. In a spectacular film about the future, which was made at Shepherd's Bush, it was imagined that the long-talked-of tunnel beneath the English Channel had at last been built. A railway train running through the tunnel was supposed to blow up, making a hole in the roof and letting in the water. It was a terrific scene, and the actors got almost as big a thrill from making it as the public did in watching it.

The train blew up with a deafening explosion, filling the whole studio with acrid smoke. The air was filled with the sound of smashing woodwork, breaking glass, shouts, and yells. Then fourteen tons of water were released through the broken roof of the tunnel, pouring down in a solid torrent on the heads of the dozen men and women who took the parts of travellers in the ill-fated train. The terrific force of the water was far more than any one had bargained for; one of the actresses mouths so that, when they spoke, or blew on to their hands, the evaporating ice sent out clouds of vapour.

This is just one example of the care taken to make every detail as realistic as possible.

British studios, too, have done wonders with faked landscapes. For Alexander Korda's production of his film about Catherine the Great of Russia, for example, a section of Elstree was converted into a section of Moscow. The bright domes of the Kremlin were erected, of plaster and fibre half an inch thick, and a scene of frozen desolation provided: fir trees were "planted" by sharpening their trunks and driving them into the ground, and salt, cotton-wool, and plaster supplied the snow and icicles of midwinter. Expensive, but less expensive and probably more satisfactory than "shooting" the scenes in Moscow itself.

Here is an example of care of a different kind.

In one of the British studios a thrilling episode on shipboard was being shot. The scene was the wireless cabin. The operator, having sent out a message, removed his ear-phones, and noticed that the engines had stopped. He looked up, saw the face of a Chinese mutineer in the skylight above him, and tapped out a distress signal at terrific speed before the Chinaman flung a knife between his shoulders.

On the screen this episode lasted seventeen seconds, but it was rehearsed in the studio for two hours. The actual sound effect was made by a trained signaller, who tapped out the message on a buzzer in the Morse code. The actor playing the part of the operator synchronized his movements with those of the signaller, and everything was exactly timed, the removal of the head-phones, the upward glance, and the frantic S.O.S. message being worked out to the tenth of a second by means of a stop-watch.

The trained signaller was specially engaged in case any member of the audience should be able to read Morse, although, as he worked at a speed of forty words a minute, it would have needed a highly skilled man to detect a mistake.

CHAPTER III

EDITING THE FILM

WHEN a scene has been photographed and the spool of film developed it is by no means ready for exhibition to the public. In the making of a story, 70,000 feet or more may be exposed; but as a full-length feature film is rarely more than 7,000 feet long, at least nine-tenths of the original work has to be scrapped, and the task of selection falls mainly on the cutting editor, whose work forms one of the most intricate and difficult branches of the industry.

The spools of film are put on to winding machines that resemble conveyer belts, so that the editor can examine them, the sound track on one spool and the mute picture action on one or more others, according to the number of cameras that were used on the set. With the aid of the moviola, a machine for projecting the film on to a small white background under a magnifying glass, and a sound-apparatus which enables him to listen through head-phones to the sound-track record, the editor examines every " take," and makes rough cuts, eliminating only the shots which are obviously useless. Then the rest of the material is taken to the studio theatre, where it is examined by the cutter, director, and other officials, who hold a long conference and decide which one of the "takes" of each scene shall be retained for the editor to work on. This process is gone through with every series of takes until the shooting of the picture is finished. Then the editor is left with a higgledy-piggledy assortment of strips of film, all different lengths, numbering perhaps four hundred or more.

The editor's first job is to take all these pieces and sort them into their proper order. He has a copy of the script on which the Continuity Girl has written various notes during the actual filming of the scenes, and with this to help him he sets to work; but his chief guide is the number board which is held in front of the camera before the taking of each shot: without this he would be hopelessly lost.

He works with the action and sound-track films separated. The sound film and the mute-action film or films, according to the number of cameras, are arranged side by side on the winding machine, and are set going together. The clapper boy is used as a guide to get sound and picture in synchronization, the moment of impact of the two clapper boards on the mute film being arranged to correspond with the mark of the bang on the sound track.

The task of the editor is to select the best pieces of each shot, keeping strictly to the scenario, and to join them together to make a film 7,000 feet long. But such a bald statement gives no real idea of the magnitude of his task. Expert cutting is an art acquired only after years of experience in the moving-picture industry. It calls for a sound knowledge of film technique, for imagination, for clear judgment, for a sense of rhythm and balance, for an understanding of the proper value of the spoken word, and many other qualities.

Much of the effect of a film depends upon the way in which it is edited. The cutter must know how to convey to the audience any kind of emotion that the story may demand. Supposing there has been a street accident. There is no need to harrow the feelings of the audience by showing the actual accident; a much better effect can be got by showing a quick series of incidents, each illustrating a different point of view—a woman covering her face with her hands, a policeman running, a man dashing out of a shop, windows being flung up, and so on. Each shot will be on the screen for only a few seconds, and the cutter can impart a breathless, thrilling effect by having a series of swift shots, each a little shorter than the last.

The cutter must provide plenty of variety, yet keep a sense of proportion. It is astonishing how rapidly the eye tires of watching the same scene. A shot rarely stays on the screen for so long as half a minute. The average time is about fifteen seconds. If this seems incredibly short, it can easily be tested on any visit to the cinema.

If the attention of the audience is to be held, the camera angle or the setting ought to be changed four or five times a minute. Too many close-ups produce a bad effect, but so do an excessive number of long shots, so that they must be mixed with great care. Again, fast-moving shots, such as those taken of a motor race from a motor car, rapidly produce a feeling of dizziness.

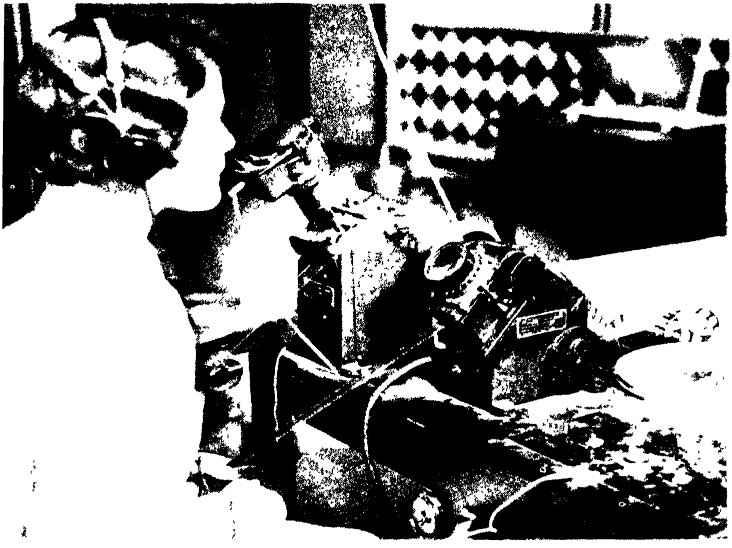
They must be broken up with quieter shots if the audience is not to experience discomfort.

In a big scene, such as one of a crowd of people dancing in a ballroom, several cameras work at once in order to get changing points of view, because the eye would soon weary of watching one only.

On his winding machine the cutter has all the films that were taken simultaneously by different cameras, and he takes first a piece of one and then a piece of another. But he does not do it haphazardly. He listens to the music or the conversation all the time. If the principal sound is the playing of a band, he tries to make his changes from one angle to another correspond to the rhythm of the music, so as to get a harmonious blend of music and action. Similarly, if two performers are holding a conversation, the editor chooses the most suitable points in the dialogue at which to make his cuts.

There are some film directors who love to introduce tracking shots whenever possible. We have all seen those tedious shots of a maid walking through two or three rooms, across a wide landing, down a flight of stairs, and through a hall in order to answer a ring at the front door. Such a device can be quite useful to increase suspense, and in the early part of a picture it is valuable to show the lay-out of the house, if it is important that the audience should understand just where the rooms are; but the stunt can be, and often is, merely boring. One gets the impression that the camera-man is just trying to be clever. A good cutter knows very well that tracking shots of this kind merely slow up the story, and he will do his best to limit them as much as he can.

A model for " Letting in the Sunshine " (*B.I.P.*).



Using the Moviola (see page 35). (*Home Movies and Home Talkies.*)

These are only a few of the hundred and one points with which the cutting editor has to be familiar. Every new film bristles with fresh problems, and the ultimate success of the picture will depend largely on how he tackled them.

CHAPTER IV

SEEING AND BELIEVING

By means of one of the most revolutionary inventions since the coming of talking pictures it is possible for actors to walk in the shadow of the pyramids, or climb the Eiffel Tower, or cross a crowded street in Berlin without leaving the studio at, say, Elstree !

This device, known as the Dunning process, is the invention of a young American, Dodge Dunning, who began his experiments with it while he was still at school. The setting, whether it be the Sahara Desert, Niagara Falls, the Shanghai Bund, or any other remote spot, is photographed separately on yellow film. The actors perform before a blank background, and are photographed on blue film. Then the action film is superimposed on the other, and one positive made from the combination.

If you were to take a single photographic print from two negatives, one laid on top of the other, the top picture would appear to be transparent ; you would see the bottom one through it. But by using the two colours, yellow and blue, the Dunning process does away with this, and the actors come out solid.

Another device which produces a similar effect is called *back projection.* A ground-glass or gauze screen is rigged up at the back of the set, behind the actors, and a film projector behind the screen throws a moving picture of the scene upon it.

All the big studios keep a library of film shots of all kinds of backgrounds, so that any required setting can be faked in the studio whenever it is wanted. Thus, when the director wants to show the cowboy standing on a mountain-top with the heroine, while he points out to her the dark storm clouds rolling up out of the west, there is no need to drag the whole company off on location to some rocky wilderness, there to sit down and wait until suitable storm clouds appear. The director just sends to the studio library for a couple of hundred feet of storm clouds on mountains, and the whole thing is faked in the studio in a twinkling.

"*Rome Express*"

Lavish use was made of back projection in the first film produced at the Lime Grove studios of the Gaumont-British Corporation. This film was called *Rome Express*, and all the action took place either at the Gare de Lyon, in Paris, or on board the train which was seen speeding by day and night across the Continent on its journey from Paris to Rome. But the players did not leave Lime Grove. Everything was done there without going off the set. A giant locomotive belching steam and smoke, dining and sleeping-cars and a guard's van, were built in the studio under the direction of railway experts, and a miniature working model, an exact replica of the famous train, was also constructed.

The only shots taken outside the studio were those employed in creating the illusion of speed. A camera-man travelled on the real Rome express and filmed the countryside as it scurried past the windows of the train. These pictures were afterwards back-projected on to the ground-glass screens placed at an angle to the windows of the carriage built on the studio floor. Therefore when the cameras filmed the action in the studio they also filmed the racing landscape as a passenger would see it from his seat.

A different method was necessary to produce a similar effect for night scenes, since the camera-man could not take films after dark. In one of the studios a panoramic model was built, forty feet long, containing midget stations, farms and houses, minute advertisements, pigmy telegraph poles, trees and fences, gently undulating fields and hills. Parallel to the panorama, which was painted a very dark grey, ran a track carrying a mobile camera.

The studio was thrown into complete darkness except for a spotlight fixed to the camera. In front of the spotlight a board was fixed. The board was slotted at intervals, and thus threw patches of light and shadow on the model, just as a lighted train would do. As the camera moved along the track it took a film of these patches of light sliding across the countryside, and the film was back-projected in order to give the illusion of night-time outside the windows of the train.

The climax of the story arrived when the villain was trapped in the guard's van by the police. Rather than be captured he opened the door and jumped out. Since there was no window, the passing countryside could not be seen until the door was flung open. Then on the ground-glass screen the back-projected landscape ought to appear. The man operating the projector used some odd lengths of film to get his camera warmed up and running smoothly, and when the scene was shot for the first time everything went well until the villain dramatically heaved the door open. The back-projection operator was not yet ready, and the villain leaped straight into a subtitle!

Tricks of the Trade

It is often necessary to give an appearance of loftiness or width to a set which it does not actually possess. The scene may be a railway station, or a ballroom, or the interior of a theatre, perhaps. In such a case it is not likely that even the largest studio would be big enough to hold the setting.

To combat this difficulty the property wizards have evolved a clever scheme which enables the audience to see something that is not there.

The missing portions of the set are reproduced in a beautiful scale model which is suspended at an angle behind the camera. In front of the camera lens, at a corresponding angle, is a mirror. Some of the quicksilver on the back of the mirror is removed to an exact outline so that the studio set can be filmed through it while the missing portions, reproduced in the model, are reflected into the lens from the portion of the mirror that remains intact.

The resulting picture on the film shows the set full size and complete. This device calls for the most careful adjustment in order to show no break or irregularity where the reflection and the actual set join. It is a masterpiece of ingenuity, and the illusion of added height or width is complete. The device is known as the Schuften Process.

The ease with which film makers deceive their audiences is breath-taking, and sometimes it is rather humiliating too.

One afternoon I was in the B.I.P. studio theatre at Elstree, watching some rush shots being run through on the screen. They were early morning farmyard scenes, and one of them showed a cockerel, squatting on a five-barred gate, which at the appropriate moment stretched out its neck and crowed.

After the rush was over I ventured to remark that it must have taken considerable patience to get that particular shot. My observation was received with a wry smile that somehow suggested that I had made a howler.

" That bird is a stuffed one," they told me quietly.

" I can't believe it ! " I remonstrated.

They chuckled with satisfaction, and no doubt my innocent bewilderment must have seemed very comic.

" We're going to run it through again in a minute," they smiled. " Stay and watch, and you will see how we fooled you ! "

The rush began all over again. I waited impatiently for the earlier sequences to be got over. Ah ! Here was that cockerel once more, and now that I knew about it, he certainly did look stuffed, perched on that gate without moving. But I was perfectly convinced that I had seen him stretch out his neck and crow.

Suddenly the scene changed. Not the cockerel now, but his shadow on a wall. The shadow elongated its neck. It crowed. It was all over in a second or two, and the film flashed back to the confounded bird!

Of course the shadow was a skilful fake, and the crowing had been dubbed in from the studio's sound library afterwards.

Sound Effects

Sound has opened up an entirely new field for the faker. As already explained, the sound track on a film comprises a continuous series of jagged lines. By studying these, experts have found it possible to draw artificial sound tracks to imitate the human voice or any kind of musical instrument. They can, in fact, produce sounds out of nothing.

This device proved exceedingly useful in a certain American film in which one of the characters was a very objectionable English peer. It was found that by a foolish oversight the character had been given the name of a real peer, and, of course, he had to be rechristened throughout; but there was no need to make a new sound track. At every point where the original name occurred it was blanked out and the new one drawn in.

Nearly every film gives the directors some scope for faking. A good rough-and-tumble fight, for example, looks much better if it is faked than if it is real. To make it really fast, the cutting editor may decide to cut out every alternate frame, thus making the actors appear to move twice as quickly on the screen as they do in front of the camera. And the resounding smack that is heard as the hero hits the villain on the chin does not occur in the fight as it is filmed; it is dubbed into the sound track afterwards.

Strangely enough, a real fight does not always look real on the screen. A news reel of an actual boxing contest sometimes produces the unfair illusion that the boxers are performing in a very half-hearted manner, because a real punch loses momentum as it reaches the opponent's body. In a screen fight it is often better to arrange the combatants so that the apparent knock-out blow is actually dealt just past the victim's ear, out of view of the camera.

All kinds of comic effects can be produced by tricky manipulation of the finished film. When the fat man treads on a piece of soap and whizzes along on one foot, for example, the dodge of cutting out alternate frames can make him appear to move with ludicrous speed.

Other very funny effects can be produced by running the film backwards. There is no need to feel sorry for the slapstick comedian when he gets a terrific bang on the head from a chair or a falling weight, or something of that kind. There is nothing painful in the process if the action is done in reverse, beginning with the object resting on his head and then lifting it off swiftly!

There are many other ways of using this device. If it is necessary to show a man being shot by an arrow, the arrow is jabbed into a cork pad worn under the actor's clothes, with a thin black thread tied to the end of it, and it is jerked out by a man standing on the edge of the set. When the film is shown in reverse motion the arrow apparently comes towards the man and hits him.

Film producers are not always very keen to let the public know how they work their fakes. They like people to think that they are witnessing the real thing. But it is possible to go too far. Some time ago an American firm released a much advertised travel film which, the public was led to believe, had been made entirely in Africa. There was a storm of protest over a scene in which a native was mauled by a lion. The cries of the poor man were heart-rending. The incident was thoroughly objectionable, and people did not hesitate to say so. Then the producers admitted that the whole scene was a fake, and it later transpired that all the sound effects had been dubbed into the film after it arrived in Hollywood for editing.

In another scene in the same film a lion dragged an apparently live wart hog from its hole, within a few yards of the camera, and carried it off by the scruff of the neck—a very thrilling incident for the audience, for it looked as though it must have involved great personal danger to the photographer. Actually the incident did not happen in Africa at all, but in California. The lion was a tame one, and the wart hog was already dead, the appearance of life being given by drawing it from its hole by an ingenious arrangement of wires.

Faked Sets and Models

There is great scope for the clever faker in the construction of studio property. It might, for example, sound rather a tall order to reproduce at Elstree on a summer day a realistic imitation of an ice-covered shack on the edge of a frozen lake, in a snowstorm. But the property department is not dismayed. Rock salt is used for imitation snow. Icicles are made from tallow. The frozen lake is constructed from sodium hyposulphate, the "hypo" which photographers use for fixing prints. Frost patterns are made on a window by spraying the glass with a solution of epsom salts.

To produce the snowstorm a number of electrically heated metal plates are installed round the set. At the required moment tablets of a secret chemical composition are placed on them, and these vaporize and go up towards the roof like a cloud of steam, which condenses, sending down a thick shower of white flakes.

Very realistic cobwebs can be made with an instrument which somewhat resembles an artist's air brush, and which sprays out a thin solution of glue or rubber through a rapidly revolving disc.

All kinds of spectacular things can be done with models. At one time, before stunt pilots learned how to crash aeroplanes with a minimum of risk to themselves, such smashes were always carried out in miniature, but nowadays there seems to be nothing which the expert airman cannot attempt and survive, from crashing in flames to diving through a (specially constructed) brick wall.

Shipwrecks have often been faked with models in a tank. On one occasion, when a shipwreck was done in this way, the directors were not satisfied with the first "rushes" of the film shown in the studio theatre. Although the vessel sank realistically enough, it seemed to lack something, and they decided that the trouble was that there was no sign of life aboard the vessel. You cannot get real actors aboard a toy ship in a bath of water; but the property man solved the problem. He got a dozen cockroaches, and when the ship began to sink he tossed them into the water. The effect was startling. To the spectator it seemed that the picture on the screen showed the crew struggling for their lives in the tumbling sea.

It should not be thought from this that models are always used. There are some directors, especially some American ones, who are such sticklers for realism that they will not consider the idea of using toys. In one film depicting a sea battle, a full-sized ship was bought, loaded with dynamite, and blown sky-high. But it is only rarely that the results justify the time and lavish expenditure necessary for such realistic displays.

A Double Life

Sometimes a film calls for one actor to play two parts, it may be as father and son, or as twins, or in one of those incredible stories of mistaken identity in which two people are so much alike that one is blamed for the misdeeds of the other. Such stories give the camera-man and the cutting editor plenty of chance to show their skill, and most people must have seen, at some time or other, pictures in which an actor talks to himself, shakes hands with himself, fights himself, and even holds himself in his own arms.

The Dunning process may be used, but there are many other ways of working the trick.

Take first the simplest instance, the one in which an actor holds a conversation with himself. The most straightforward way of arranging this is to mask the lens so that only half of the film is exposed at a time. The actor stands in view of the camera, and he has to imagine that the other character is in front of him, although, actually, there is no one there at all. He talks to this non-existent person, argues with him, flourishes his fists in his face, and so on, according to the requirements of the script, until the director gives the order to cut. The film is wound up again, and the exposed part masked off. The actor crosses to the opposite side of the set, and the dialogue which he has already spoken is played back to him over a loud-speaker while he goes through the second character's actions and words.

The trick of making an actor shake hands with himself is also done by masking out each half of the picture in turn. Another actor stands on the half of the set that is blacked out, and puts his hand in focus for his " double " to grasp. After that, of course, the actor crosses over and stands in exactly the same position, to be photographed. Such shots have to be done with great care. They must be calculated to the tenth of an inch, for if the two halves do not match, even by the tiniest degree, the fact will soon become apparent when it is subject to the huge magnification of the screen.

Many years ago Mary Pickford did a clever double performance as mother and son in *Little Lord Fauntleroy*, when the thing was a novelty, though it has been done many times since. In one scene the son actually ran into his mother's arms to be hugged, and audiences were bewildered by this seeming impossibility. Right up to the point where the son reached his mother's arms, Mary Pickford was able to play both parts by having the two halves of the picture masked out alternately. From that point a double came in to take the son's part, and for the rest of the scene the camera-man had to exercise great care not to get the son's face into the picture, but only the back of his head, or the deception would have been obvious at once.

A similar method is used when a man fights himself. A double whose physique is similar plays one part, but not always the same part. Let us suppose that the actor is playing twin brothers, one of whom is wealthy, and in evening dress, the other poor, in tattered garments. They fight. The camera-man cunningly arranges his photographic angles so that only one face is shown at any given time, the face of the man playing the dual role. A number of shots, including close-ups, are taken of him in evening dress, and others in the tattered clothes. When the cutting editor gets hold of these shots he cunningly intermingles them, alternating quickly between the actor as the poor man and as the rich man. You never actually see both faces at the same time, one being always turned away from the camera, but by a series of quick changes a perfect illusion is produced, and the audience goes away quite convinced that it has seen both faces at once, and watched the impossible spectacle of a man fighting with himself.

There are practically no limits to this form of deception. In a film aptly titled *Only Me*, Mr. Lupino Lane played the entire cast, and there were twenty-three characters !

CHAPTER V

THE NEWS IN PICTURES

ONE of the most precious pieces of film in existence is a badly streaked, blurred strip showing Queen Victoria riding in her carriage—the earliest known forerunner of the modern news film.

In the early days of films, before picture theatres came into existence, odd scraps of news were recorded by private showmen for use in peep-shows, or music halls, but it was not until 1910, when cinemas had already begun to spring up, that news began to be seriously regarded as a regular part of the programme, and the French firm of Pathé Frérès was founded to devote all its activities to making news reels. At first all the film was developed and printed in France, so that pictures of English events sometimes took several weeks to cross the Channel and come back again; but the service was soon speeded up, other news-reel firms appeared in the field, and the system of releasing a new reel every week was established. Later on a three-day service was developed, and now it often happens that important events appear on the screen on the day on which they happen.

This calls for great speed and clever organization. In many ways the making of a news reel resembles the making of a newspaper. It has its editor, who arranges what subjects shall be filmed and allocates the work to the camera-men and sound experts, who correspond to the reporters of a newspaper. The men and equipment journey to the spot where the picture is to be made in a *sound truck*, a motor van which carries the sound-recording apparatus—microphones, lengths of cable, cameras, etc.—and which costs about £10,000 to equip.

When the production company wishes to show news pictures of some popular event on the very day, motor cyclists are employed to dash back to the laboratories with the negatives. In the case of the Cup Final, for example, expert dirt track riders have been specially engaged, and the pictures of the game have been shown in the London cinemas at six o'clock on the same evening, before some of the spectators have had time to reach home!

As the years pass, the camera-man finds himself faced with one particular problem of increasing difficulty. An annual event, such as the Boat Race, the Cup Final, or the Trooping of the Colour, differs very little, from a pictorial point of view, from one year to the next, and a novel angle must be found if the picture is to appear fresh and hold its audience.

This was done successfully in a recent film of the Derby, when pictures of the actual race were preceded by shots of people's feet! All sorts of feet appeared—dainty and clumsy, spatted or mud-bespattered, smart and down-at-heel, as the camera-man picked his way along the course. Then the film showed wheels revolving: bus wheels, limousine wheels, motor-cycle wheels, donkey-

An artificially-created forest fire with oil lines bringing fuel: " Clancy of the Mounted " (*Universal*).

A model for " Mr. Bill the Conqueror " (*B.I.P.*).

barrow wheels. This treatment successfully indicated the mixed crowd of humanity that had gathered to see the race, and did so in a novel way.

Checking the Referee

At an Association Football Cup Final as many as fourteen cameras have been stationed at various points round the ground to capture the exciting moments of the match. Naturally there is no knowing when a vital goal is going to be scored, so that one or more cameras must be working nearly all the time, and as much as 6,000 feet of film may be exposed, enough to make a full-length feature picture. Later this is cut down ruthlessly, only the most thrilling episodes being chosen, and the version that eventually reaches the cinemas runs for five minutes.

In such a fast-moving game as football it is not surprising that the human eye is not always quick enough to see the truth, and even the most expert referee may make a mistake. But the film camera, making twenty-four exposures a second, is not deceived. In the 1922 final between Huddersfield Town and Preston North End the referee awarded a penalty against Preston, from which Huddersfield scored the only goal of the game. When the news reel was developed it was found that the foul had been committed about a foot outside the penalty area, so that the referee was in error in awarding a penalty kick. Again, in 1932, when the Newcastle United team defeated the Arsenal by two goals to one, there was a vigorous controversy over the winning goal, and the news reel showed plainly enough that a player had indeed taken the ball over the touch line out of play and brought it in again before he scored the goal. So a football film sometimes has additional interest for players and referee.

At least twenty events are filmed every week by the news camera-men, but not more than eight or nine of them are used, and even fewer find their way into the released reel, because room usually has to be found for some items from overseas. The editor does not confine himself to matters that can be reached by his own sound trucks. Like the newspapers, he has his foreign correspondents, and he is constantly receiving material from other centres—Paris, Berlin, New York, Sydney, and, indeed, all over the world.

Danger and Humour

Exciting things are always happening somewhere, and if it is humanly possible a camera-man will be on the spot. There was one aboard the Graf Zeppelin during its flight over the Pole. When the airship got to Russia officials wanted to confiscate his negatives, but he hid the tins between two gas bags until they were out of the way.

When the Spanish monarchy was overthrown a news-reel man was in the thick of the rioting mobs, who were furious when they discovered him. An ugly situation developed. The camera-man was surrounded by soldiers, and he was commanded to hand over his negatives; he meekly surrendered a tin of film, and they let him go.

But he had been too astute for them. The tin contained only blank unexposed film ; he managed to smuggle the real negative out of the country undetected.

There is humour as well as excitement in making news reels. At the coronation ceremony of an Eastern potentate a squadron of aeroplanes circled over the spot, and at the appropriate moment they dipped in formation as a salute. Unfortunately they flew so low that the crowd was struck with panic, and everybody, including the dignified potentate himself, threw themselves flat on the ground ! The only man to remain calm was the camera-man, who stood by his machine and got some amusing shots of the ludicrous incident. But, to his chagrin, a cautious editor cut out this scene before the film was released for public showing.

There is keen rivalry between the cinema companies when the chance of a scoop appears. On one occasion, the details of which are best left unmentioned, only one company managed to get permission to send its sound truck, and as the precise locality of the event was kept secret by the authorities in charge, the rival companies did not know where to send their trucks. So their drivers took them to the headquarters of the lucky firm, with instructions to follow the official truck wherever it went, and though an attempt was made to counter this move by sending decoy trucks in various directions, it did not quite succeed. The truck arrived on the scene closely followed by a rival. Both began to set up their equipment, and then came trouble. Heated arguments developed into a rough-and-tumble fight between the crews, and eventually it was the unauthorized company that succeeded in getting pictures: the equipment of the legitimate truck was too badly damaged to work!

Interviewing Famous People

Like the editor of a newspaper, the news-reel editor is always anxious to secure interviews with famous people on topics of the day, and most of the persons approached are only too eager to say a few words into the microphone. Their faces fall, however, when they learn that they must compress all they have to say into about a minute and a half.

One of the first men to give a talking interview was Mr. George Bernard Shaw. He surprised the technicians with his knowledge of cinema photography, and at one point he spontaneously remarked, "This is not a case of swelled head, but merely the camera-man changing his lens from a long shot to a close-up!" This appropriate remark was allowed to remain in the finished film.

Many people are startled when they see and hear themselves on the screen for the first time. On seeing a close-up of herself, a famous lady novelist exclaimed, "Good gracious! That's not me! Not that woman!"

It is strange that some famous people who constantly speak in public without the least self-consciousness become shy when they are asked to face the sound camera. Mr. Stanley Baldwin is one of those who find it an ordeal; he is particularly bothered by the strong lights, and as soon as it is over he buries his face in his hands.

Signor Mussolini, on the other hand, welcomed the invitation to a talking interview which would enable him to express his political opinions to the British public, and although he could not speak English he valued the opportunity so much that he took the trouble to learn by heart a speech in the English language.

To photograph the arrival of a long-distance flyer is one of the most difficult jobs of all. Nobody can tell, within several hours, at what time the flyer will arrive, and it is also a matter of luck whether the apparatus is set up in the right place, or whether the flyer will come down in some distant part of the field where he is right out of focus and out of range of the microphone. And of course there are always vast crowds pushing round, falling over the cables, obscuring the view of the camera, shouting into the microphone, and so on.

When the aviator arrives at last he is piloted to the microphone to " say a few words." Men of action are rarely good at making speeches. The dauntless hero who has braved the terrors of ocean, jungle, and desert, stammers nervously and looks as if he is about to burst into tears, feeling like a small boy called upon to recite at a church social and wondering what to do with his hands. Very often all he can say is something like this :

" Er—I am very pleased—er—to have—er—um—been able to make this flight. My—er—machine behaved perfectly. Er—thank you—um—very much."

Editing the News Reel

When the films have been hurried back to headquarters and developed, they are run through a projector and shown on the screen. The *negatives* are shown, which means that black appears as white and white as black; the Prime Minister, for example, looks like a negro in flannels. There is no time to print positive films of everything that has been shot, and much of it will never be used, so the editor works with these curious inside-out pictures, and his experience enables him to pick out the best sequences for printing.

Many news pictures require a few words of explanation, and this is where the commentator gets his chance. Sometimes he speaks into the microphone while the event is being shot, but there is always the danger that his voice will be "mushed" by noise; the usual process is to add the commentary later in the studio.

The film still has to go through one more process. It is taken to the cutting-room, where the editor sorts out the various shots and pieces them together. The most difficult thing for him to handle is the interviews. Embarrassing pauses occur whenever the talker "ers" and "ums" or remains speechless for a few seconds while he tries to recall what he wants to say. There may be interruptions, too. A politician addressing a meeting, for example, began by saying:

"I am conscious——" Then he paused for a second, and a heckler broke in:

"But only just!"

"—of the vital need . . ." continued the politician, too late to prevent a roar of laughter.

The interruption was, of course, recorded on the sound track, and it was the editor's task to cut it out—a task not so simple as it may appear at first sight. Very few people stand perfectly still when they are talking: they shift about restlessly, turn their heads, move their arms, and to cut out even a small part of the film means giving the speaker a sudden jerk which appears grotesque on the screen and makes a bad impression on the audience. And if the sound track alone is blanked out there is a harrowing silence which makes the audience think something has gone wrong with the apparatus. Still, that is the editor's job, so we must leave the puzzle to him.

When the film is ready for release about two hundred copies are made, each to be shown at four or five cinemas. It costs about £10 to rent a news reel for its first three days' run, and the cost declines as the news becomes staler, so that by the time the film reaches a small cinema, two weeks or more later, it costs only £3. After that the reels are recalled and destroyed, except for one copy filed in the company's library.

A recent venture which has proved immensely popular is to have cinemas devoted exclusively to news reels and short travel pictures, and there are now several of them in London. One, which has a seating capacity of only five hundred, has a million patrons a year.

CHAPTER VI

THE STORY OF "MICKEY MOUSE"

WALT DISNEY, the man who has caused untold millions of laughs by his invention of Mickey Mouse, began his career as an artist on a Chicago newspaper, but the job offered him little scope, and he drifted on to Kansas City, to work on several western American papers in turn. For some of them he drew daily comic strips, and it was while he was doing this type of work that the idea came to him of making an animated comic strip for the screen. He threw up his job and went to Los Angeles, with the high hopes usually entertained by new arrivals at the famous city where such huge fortunes can be made—and lost.

Disney's first ambition was to be a director, nothing less. He went from studio to studio, taking on small jobs of every kind and learning the technique. Then, with his brother Roy, he set about making animated cartoons in an empty storeroom. Their first subject was *Alice in Wonderland*, and the scheme was to give novelty to the cartoon by introducing a real live character, which was done by taking photographs of a girl and superimposing them on the cartoon drawings. The original Alice films were not made to be shown in cinemas, but were intended for church socials, clubs, and so on.

The brothers had only about £100 between them when they started on their venture. Walt wrote the scenarios, drew the cartoons, and built the sets. He pounded nails, laid floors, and went home night after night dog-tired, his clothes caked with grime and misplaced cement. Back alleys and waste plots of land were used for the sets. Roy was the camera-man, and a very amateurish one ; he taught himself as he went along. The brothers could not afford to hire a man, who would have cost them at least £5 a day. Roy learned to keep one eye on his brother, who gave advice in a hoarse stage whisper, hoping that the crowds of people who always collected to look on would not realize what a couple of duffers they were. Neither of the brothers had ever seen a Klieg light, let alone used one.

The novelty of the Alice films brought a measure of success, so that the Disneys were able to hire assistance and move into a larger room. Then Walt struck the idea of making an animal the central figure in his stories. He decided upon a cat, which he called Oswald, and he worked at it for some time with only a moderate amount of success.

Enter Mickey

The turning-point of his career was close at hand, however. An idea that had been simmering in his head for months took shape at last. He thought of a mouse. A mouse dressed in white breeches and big boots. A mouse with ludicrous round ears, and a button on the end of his nose.

Disney racked his brains for a name for this new character, and finally decided on Mortimer the Mouse; but the name was greeted with derision by film directors when Walt discussed the plan with them, and so he put on his thinking-cap again and re-christened his hero Mickey Mouse, the name which was destined to become world-famous.

Immediately Disney and his staff set to work enthusiastically on the new scheme. A full-reel picture was completed, and then came what looked like the crowning disaster: talking pictures arrived. Al Jolson was making screen history with *The Jazz Singer* and *The Singing Fool.* Producers were joining in a hysterical rush to adapt sound to pictures on which they were working. Pictures which had been completed but not yet shown at the cinemas were frantically recalled, speech was added to the last few feet, and musical accompaniment was worked in, so that they could be billed as talking pictures.

Poor Mickey seemed to be in a hopeless position. He was dumb, and nobody wanted him. Disney went round the Hollywood studios begging for the use of sound apparatus, offering to hire it for large sums of money. But nobody would listen to him; they had no time for cartoons. He went to New York, where, after many more weeks of set-backs, he managed to arrange with an independent company for Mickey to be made to talk; but even then his troubles were not over. He had the greatest difficulty in finding some one willing to show his picture when it was done.

At last he succeeded in placing it at the Colony Theatre, New York, and in a single night Disney knew that his dreams had come true at last. Mickey became a front-rank star at one jump, and the famous American journal of the entertainment world, *Variety*, sealed his success by its praise. This picture, the first sound cartoon, was called *Steamboat Willie.*

Later Disney began to produce his equally famous and even more clever *Silly Symphonies*, in the best of which his work comes very close to genius.

Most film producers were content to use music merely as an accompaniment to the drama. Disney went much further. Music and action became inseparable in his productions. Indeed, in the Symphonies the action might almost be described as a pictorial interpretation of the music.

The next great step forward was taken towards the end of 1932, when, for the first time, the cartoons were done in colour. It was then that Disney joined the United Artists Corporation, and so placed Mickey among the foremost screen performers, for to this organization belong Charlie Chaplin, Douglas Fairbanks, Mary Pickford, and others whose ability has stood the test of time. (And how few " stars " can stand that test !)

How it is done

Disney employs about one hundred and fifty assistants, who are fully occupied in turning out one Mickey Mouse cartoon and one Silly Symphony each month, their united efforts producing two reels of film, each 600 feet to 700 feet long, to run for five or six minutes, for there are sixteen frames to a foot of film, so that 11,000 pictures are needed for a single reel.

The work on the film begins with a conference of the staff. Ideas are pooled. Sometimes a musician gets an idea, and Disney fits his story to it. At other times Disney gets the idea and the musician evolves a suitable harmony. But in either case a sense of rhythm is always the first consideration.

When the story is completed and the script and music are written, it is ready for the artists, each of whom has a definite part of the picture to draw. Disney himself assigns these tasks, for he knows just what type of work each can do best. Some draw backgrounds, some animals, others motor cars, and so on.

Each artist works at a large drawing-board with a plate-glass panel approximately seven by nine inches, fitted in the centre. An electric bulb shines through the glass, enabling the artist to follow the development of his drawing through several thicknesses of the semi-transparent paper which is used.

The first man to handle the drawing is the " animator," who draws only the beginning and the ending of each action. If a scene depicts Mickey walking along, the animator's first sketch shows him starting a step and the next finishing it. By placing these drawings together above the lighted panel the second artist is able to see the limits of the action, and can add the intermediate drawings which will make the action smooth.

The number of these drawings is carefully worked out beforehand, so that when the complete film is run through the projector at the standard speed of ninety feet a minute, the rhythm of the action will harmonize with the music.

After the drawings are completed they are handed on to a number of girls, who trace them on sheets of celluloid. Then they are filled in with the proper shades of colouring.

It may require as many as four different sheets to make a single finished drawing. Supposing a film depicts Mickey and another character riding along a country road in a motor-car, on one sheet of celluloid the background of road and hedges is drawn, on a second another artist has done the motor-car, a third has done Mickey, and a fourth has done the other character, so that sixty-four pictures are required, instead of sixteen, to make one foot of film.

When the celluloid copies are finished the work is ready for the camera-man, whose task must be one of the dullest in the motion-picture industry, for he cannot photograph an entire sequence merely by setting his camera in motion, as in ordinary film work. Each individual picture must be photographed separately, so that even the most experienced worker cannot turn out more than fifty feet of film a day.

The camera-man, with two or three assistants, takes about a fortnight to complete the photographing of a reel. Before he begins work he receives an exposure sheet showing the background and the number of celluloids for each. The background, on which the inanimate objects in the scene are portrayed, is set in place first. Then come the various layers on which the moving figures appear, arranged on top of each other to make a complete picture.

All this time the musical director has been busy rehearsing and arranging his score. The accuracy with which the rhythm of the music combines with the movements of the characters is most important. It is calculated mathematically before work is begun, so that every frame of film corresponds to the music that has been arranged for it. Drawings and music are synchronized to the twenty-fourth of a second.

In the studio's private theatre the silent version of the film is screened, so that the orchestra and the men who are speaking the dialogue can watch the action while the sound is being recorded. The sound recording and the joining of the record to the action film are completed as in an ordinary picture, and one more of Walt Disney's masterpieces is ready to make the world laugh.

CHAPTER VII

THE "SECRETS OF NATURE"

THE popular series of films grouped under the title of *Secrets of Nature* are made under circumstances as unlike those described in the rest of this book as it is possible to imagine.

The films cover the whole field of natural history, with a little popular science thrown in for good measure. They depict the life stories of animals, birds, reptiles, plants, microscopic animalcules, and so on. No swarming army of technicians, no stentorian directors, no blazing electric lights, no glamour, attend the production of these little masterpieces; they are made by Mr. F. Percy Smith, usually with only one assistant, and they are not made in a studio at all in the ordinary sense of the word, but at Mr. Smith's home in Southgate, either indoors or in the two greenhouses which he has built with the help of his assistant, Miss Phyllis Bolté.

His apparatus, too, is largely home-made, but it does not lack efficiency on that account. The cameras are all second-hand ones, and it is doubtful whether their former owners would recognize them now, so cleverly have they been adapted and remodelled to Mr. Smith's peculiar needs.

Perhaps the most striking films in the *Secrets of Nature* series are those which portray the complete life history of a plant from the germination of the seed to the blooming of the flower and formation of the fruit. Such a film compresses the full growth of a plant into ten minutes on the screen. To obtain this spectacular result the cameras are slowed down to take, usually, one frame an hour instead of the normal 1,440 a minute.

The plant to be photographed is placed in a light-proof box. But a plant cannot grow properly in the dark, so the roof of the box is composed of shutters which remain open except when a photograph is to be taken.

The electric motor which drives the whole apparatus is run on a two-volt accumulator, and set in motion by a piece of clockwork—literally the works of a clock. Instead of hour and minute hands the spindle carries a disc from which one or more points project, according to the number of exposures required each hour. As the disc moves round, the points depress a thin metal arm carrying the bared ends of the energized wires into a bath of mercury, a circuit is completed, and the mechanism begins working. Then every part of the apparatus is set moving in unison by a system of geared wheels. The shutters close down on top of the cabinet to render it light proof, the twin lamps light up, their rays focused on the plant by powerful lenses, and the camera makes one exposure.

The electrical contact is then automatically broken, and the movements are reversed : the camera closes, the lights go out, and the shutters open.

Much ingenuity has gone to the making of the timing apparatus. It is the result of twenty years of experience and patient experiment, and is remarkable on account of the imagination that has been exercised in adapting unpromising material. Spade-pointed gramophone needles are used for the pins on the clockwork disc. The geared wheels are meccano parts. A piece of fishing-line is used to hold the counterpoise weight on the roof shutters. Match sticks are inserted into slip-nooses to adjust the line if it should become too long owing to dryness in the air. A piece of lamp wick is used to draw the contact arm away from the mercury bath to break the contact, and the mercury baths themselves are made from hollowed-out drawer knobs!

In order to be thorough, these life stories begin right at the beginning, with the seed sprouting its roots. On the screen the little shoots are seen to burst energetically forth from the seed and spread rapidly before the eyes of the astonished audience. They wriggle downwards and outwards, pushing out side branches and forming natural patterns that are beautiful to watch.

The thing looks so uncanny and so clever that it is difficult to believe it is not a fake, and cinema audiences are sometimes incredulous. "How can they take a picture of roots growing under the ground?" But there is no faking; the seed really is photographed as it grows. It is packed with soil in a hollow brick mould that has an open front covered with a hinged muslin flap, and this is drawn back automatically at intervals to expose the seed, so that the camera can take a photograph.

Incidentally, these moulds are home-made. They are composed of fireclay and baking-powder, and are baked in the fire.

The making of plant-life films is, however, only one of the many activities undertaken in this amazing house.

Fascinating under-water studies, life stories of amphibians and fresh-water fishes have been made in shallow tanks that Mr. Smith has built himself. The tanks are rectangular, and have a glass window at one end for the camera to work through. Two boards radiate at an angle from the window to the sides of the tank in order to cut off the two corners that are out of range of the lens. Otherwise, false to film-star temperament, the creatures in the tank would take refuge in the corners instead of allowing themselves to be photographed.

In order to give the right atmosphere these films usually begin with one or two quick shots of the creature in its natural surroundings. In the life history of a newt, for instance, we see two boys beside a pond. One of them lifts a stone and finds a newt underneath, and the little creature makes a dash for the water. Do not say:

" How lucky they were to find a newt under a stone just when they wanted it ! "—because it was put there in readiness.

" But even then," Mr. Smith remarks dryly, " the little beggars sometimes escape, and when you lift the stone they are not there ! "

When I went to see him he showed me a grass-grown hollow in his garden, which had once been filled with water to make a little pond, and no doubt it has been filled again since. It is a very modest little pond, but Mr. Smith has managed to keep six ducks on it while making a picture about them, and probably every one who saw the film thought they were swimming about on a lake.

One of the back rooms of the house is packed with still more apparatus. It is there that the films of microscopic subjects are made. Some of these require period exposures, with the camera working day and night, and if the room were not too crowded to allow space for a bed, Mr. Smith would probably sleep beside his beloved apparatus. That being impossible, he has installed a device which he demonstrated by setting the thing working and then jamming it. At once a strident bell began to ring, a positively deafening bell. If his dreams are broken by this harrowing noise he knows that he has to get up and go and look for trouble.

This room contains also a drawing-desk similar to those used by Walt Disney's draughtsmen, on which the diagrams required to illustrate knotty points in some of the films are made.

When the films are complete they are taken to the British Instructional Films studios at Welwyn, where they are edited and prepared for distribution, and musical accompaniment and explanatory dialogue are added by the studio staff.

To explain everything lucidly within the limits of a ten-minute reel is not always easy. If you are reading something in a book, and you do not quite grasp a particular point, it is a simple matter to turn back and re-read the passage, but in speech every statement must be made perfectly clear at once, or the meaning of the whole thing may be lost. This is where the diagrams are very helpful. A good diagram can frequently make things clear and interesting when a long verbal explanation would only be tedious.

This applies particularly to some of the purely educational films that Mr. Smith makes, such as an admirable one I saw at Welwyn, which demonstrated the surface tension of liquids. It is one thing for a commentator to understand in his own mind why it is possible to insert a tube into a soap bubble without breaking the bubble, why grease flows up the wick of a candle, why blotting-paper blots, and why the surface of a liquid in a tube is concave instead of flat, but it is quite another matter to put the explanation concisely into a ten-minute talk, using language that every one will understand.

Mr. H. Bruce Woolfe, of British Instructional Films, invited me to attend a conference which he held with Miss A. Mary Field and Mr. Smith on the subject of the commentary for the *Surface Tension* film.

I have listened to other producers in other studios while they discussed their embryo films, but none of them ever put such concentrated thinking into their task as did these three clever people, who had to evolve the precise form of words that would explain the theory of surface tension in ten minutes to an audience entirely ignorant of the subject.

CHAPTER VIII

TEACHING ANIMALS TO ACT

ONE afternoon in September 1932, when newspaper placards all over London blazoned the most important news of the day, they had only one thing to announce: the death of a dog in California. Such a thing has never happened before, and will probably never happen again; but that dog was Rin-Tin-Tin.

He was the most famous of animal actors. Born in Germany, he was captured in a German dug-out during the Great War by an American officer, Lieutenant Lee Duncan, who took him to the United States, and was so impressed by his intelligence that he trained him as a cinema actor.

He quickly rose to fame. It is said that he laid the foundations of the fortune of the successful firm for which he worked. Stories were specially written for him, just as they are for leading human actors. He held the stage alone for long sequences, without a human actor appearing. He endeared himself to people all over the world by his courage and his uncanny intelligence, and, thanks to the clever way in which he was directed, he was able to hold his vast audiences spell-bound with excitement and sympathy.

In the days of silent pictures training was easier than it is now, because the dog could be guided by spoken words. To-day gestures of the hand are generally used instead, but so clever do some dogs become at understanding visual signs that one trainer, Mr. Renfro, gives all his cues by showing his pets signs drawn on cards.

Scenes are carefully rehearsed first, the trainer standing just off the set and giving his instructions by signs, just as he does when the picture is being shot. If a dog is to yawn, the trainer opens his mouth wide and the animal mimics him. An order to lie down or get up is given by a wave of the hand, downwards or upwards; the dog learns to walk towards a person or object when his director points to it, and so on.

Seventy-eight dogs appeared together in one amusing story. The hero was supposed to be a professional dog-catcher who was so kind hearted that he could not bear to kill any of the homeless mongrels he caught. He went away to the War. When he came back there was just one dog waiting to greet him outside the station. He stopped forlornly to speak to the solitary animal, but the next moment a horde of seventy-seven others raced joyfully down the street!

In preparing for this scene the dogs were confined in pens at various distances along the street. The station steps were strewn liberally with tit-bits of food placed out of range of the camera. The trainer stood behind the camera, and as soon as the returning hero finished talking to the solitary dog the trainer whistled. Attendants opened the most distant pen, which contained the most experienced dogs in the troupe. When they passed the other pens the doors were opened, and successive batches of dogs joined the glorious race to secure the tit-bits of food.

The small portion of film which registered the trainer's whistle was deleted in the final editing.

Pete, the bull terrier who has been featured for many years in "Our Gang" stories, and whose comedy acting has made him a great favourite with children, began his film career in 1922 at the age of three months. In time he grew to learn his parts perfectly after a very few rehearsals, and went through his scenes without hesitation. The more he liked a particular scene the fewer rehearsals were necessary before he was ready to face the camera. During a scene he would continue to act, or hold his pose, until the director said "Cut." So well could he hold the attention of an audience that he has frequently had the stage to himself, no human actors appearing.

Pete has frequently posed for "stills," which are ordinary photographs used for advertising purposes, for display in cinema vestibules, for newspaper reproduction, and so on. At such times Pete would take up an attitude and remain in a perfectly natural pose without moving, until he heard the second click that meant that the exposure was over.

Some animals have earned salaries which must have made many human actors' mouths water. Rin-Tin-Tin's owner is said to have received £400 a week. Numa, a lion who stole the limelight from human actors in many important pictures, and who appeared with Charlie Chaplin in *The Circus*, earned £16,000 during his career as an animal actor.

Some of the most ambitious animal pictures ever undertaken formed a comedy series that were acted throughout by chimpanzees dressed in human clothes. In these pictures the apes were required to eat meals with a knife and fork, ride on horseback, play cards, shoot with revolvers, and do many other amazing things. The result was a triumph of the animal trainer's art. But what mystified many audiences most of all was the fact that the chimps actually appeared to speak with human voices.

The film was first made as a silent picture. When the producer came to a scene which required speech, the trainer would point to the animal which was supposed to be speaking, to give it the cue, and then open and shut his upraised hand several times, once for each word. The ape copied this action of his trainer's hand by opening and shutting his mouth. Dialogue spoken by human voices was recorded on a separate sound track, and the two were afterwards blended so accurately that the apes appeared to speak the lines.

Similarly, some very entertaining pictures, acted entirely by dogs, have been made. A troupe of dog actors, who perform together, are taught to know their own names and to answer only when called upon. They learn to play about together without quarrelling when off duty, and usually get along in a very friendly fashion.

But one day things did go wrong. A burlesque football match between two teams of dogs was to be filmed. Both sides were lined up ready for the kick-off, when one animal suddenly went for an opponent with a fierce snarl without even waiting for the referee's whistle to blow. The resulting free fight, in which both teams joined, was so good that the camera man kept his machine working, although he was nearly doubled up with laughter.

Many other animals besides dogs are used from time to time, usually in order to raise a laugh. Film producers know from experience that nothing causes merriment so easily as the unexpected appearance of an animal on the scene.

In a film produced some time ago a calf was required to stand beside two actors who were talking and interrupt them at a certain point with a loud moo. A calf was obtained, but it remained stubbornly dumb in spite of all promptings. Then its mother was taken away and it mooed with all the vigour necessary. Here, however, a difficulty arose. There was no room for a cow on the set, but without the cow the calf would not keep quiet. What was to be done? An ingenious trick solved the problem. A big mirror was set up just out of range of the camera, the cow was placed so that it was reflected in the mirror, and the satisfied calf remained quiet, blissfully unaware of the deep deceit being practised on it! At the critical moment the mirror was twirled round, and as the calf lost sight of its mother it mooed to the complete satisfaction of the producers.

A cat was once taught to perform a novel version of the trick of "dying for their country," which some intelligent dogs can do. This was for a film in which one of the characters was informed by telephone that he had inherited a large fortune. Overcome by the news he fainted, dropping to the floor beside the overturned telephone, whereupon the cat hurried to the fallen phone to investigate (the mouthpiece had been rubbed with fish), and then, at a sign from its trainer, rolled over in a " faint " beside the young man.

Such tricks as this occupy only a few seconds on the screen, but they may require many hours of patient preparation.

The training of any kind of animal can only be accomplished by kindness, coupled with patience. Bullying, beating, or other harsh treatment would never produce the required results, but would only cause the animal to become sullen and unresponsive.

The animals which can most easily be taught to do clever tricks are chimpanzees, horses, and dogs, with elephants and lions next. Penguins have also been used successfully, both in England and America.

Domestic cats are very difficult to train, and although they do appear on the screen quite frequently, they are usually allowed to behave naturally. They are not often called upon to act a part. If it should be necessary for a cat to walk in a particular direction, the producer makes use of a lure, such as a piece of fish, held out of view of the camera.

Even animals of the same species are not all equally adaptable to the needs of film production. They vary in temperament and in brain power. Some are nervous, some are surly, others enter into their screen work with lively relish. But even the best of them sometimes get moody. For no apparent reason a dog may leap through a window or crawl under a table in the middle of a scene, holding up production and refusing to be coaxed back on the set until its fit of bad temper is over. It is usually the younger ones who do this. The veterans who have seen long service in front of the camera seldom make mistakes or miss a cue.

When an unlooked-for incident of this kind does happen, the whole production staff is powerless. If a dog gets a fit of temperament it is no use offering him a higher salary or threatening him with dismissal. Actors fume, producers rage, and camera-men twirl their thumbs until the animal chooses to be " reasonable."

Not only animals, but birds, are sometimes needed in a film. At Tempelhof, near Berlin, where one of the biggest of the German companies has its studios, the producers were nearly driven frantic during the early days of talking pictures by the persistent twittering of sparrows which flocked in the neighbourhood. In desperation the staff resorted to traps, nets, and shotguns, until all the sparrows that were not killed were driven away from the spot. Tempelhof knew perfect peace at last. So far so good.

But there came a day when a film was being made that called for the noise of twittering sparrows; the sound was to be a special feature of the story—and now there were no birds in Tempelhof to supply the badly needed cheeps!

" Never mind," said the director, " send out for a bag of grain and have it scattered about the yard. We'll soon get some sparrows."

But the sparrows refused to come. There were none anywhere in the neighbourhood, and the director was at his wits' end.

A whole day passed and not so much as a solitary sparrow put in an appearance. The whole production was held up.

" This can't go on any longer," moaned the director. " Get in touch with a bird fancier, and have a cage of sparrows sent down."

The sparrows arrived and were let loose in the yard near the scattered grain, but, astonishing though it may seem, not one tiny chirrup did they give. They would not even pick up the grain ! Some strange instinct seemed to tell them of the unpleasant fate that had overtaken their cousins on this very spot.

Matters were at a deadlock. If a sparrow does not want to cheep not even a film director can make it do so. The most important of moving picture men, before whom actors and camera-men tremble, is powerless when it comes to dealing with sparrows which are wilfully dumb.

In the end they had to send for a variety artist who specialized in imitating animal noises, and the film company paid him a big fee to reproduce one of the commonest sounds in Europe, the twitter of a sparrow !

CHAPTER IX

INTO THE PROGRAMME

WHAT is a film star ?

By their absurd practice of calling almost any actor a star, newspapers have created the impression that the word has no special meaning ; but it has a very definite one.

At any given time there are only about fifty star players acting in all the studios of America and Europe together. Many players have gained a world-wide reputation without becoming stars. Lewis Stone has been on the screen for more than twenty years—one of the few who remain popular, year after year, while others appear in a blaze of glory for a brief period and then sink into oblivion—yet Lewis Stone is not, and never has been, a star.

An actor is raised to stardom when the production company decides that he is a bigger attraction to the public than the film in which he appears. Then his name is published above the title of the film in the publicity announcements, thus :

GEORGE ARLISS *in*

DISRAELI

with Joan Bennett and David Torrence.

George Arliss is a star in this film, but Joan Bennett and David Torrence are not; the correct term for them is *featured players.* A large number of successful films are made without a star player in the cast at all.

The little matter of being able to distinguish between stars and featured players is just one item of knowledge involved in the difficult task of getting a film into a cinema programme, and this is a side of the industry which, although it may not be so glamorous as the production work, is at least of as much importance.

The first thing for a producing company to do when a film is to be released is to arrange for trade shows at its various centres all over the world, to which are invited cinema proprietors and managers, and representatives of important newspapers.

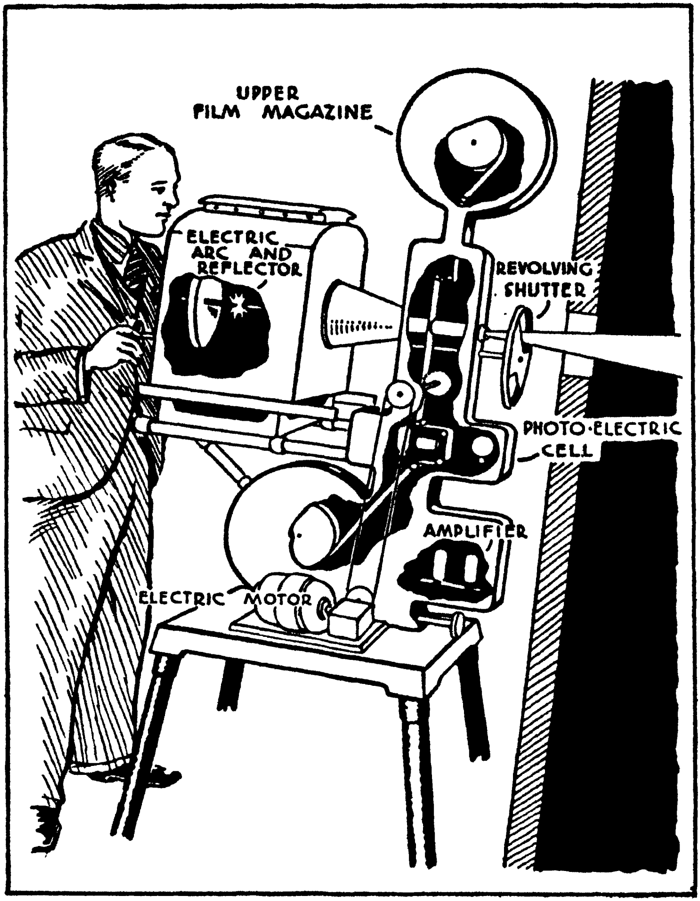
When an exhibitor decides to book the picture for his theatre, the producers assist in arranging publicity for it. Campaign sheets are sent out, containing information about the film and the players, and suitable for inclusion in the theatre programme and for distribution to the local newspapers; and short lengths of film containing incidents likely to attract patrons are sent to the theatre for showing during the previous week. These excerpts are known in the trade as *trailers.*

Besides these, the exhibitor receives linen banners, posters, newspaper printing-blocks, handbills, and "stills." Stills are photographs of scenes in the film, to be exhibited in showcases in the vestibule. They are not, as is popularly supposed, enlargements from the film itself, but are specially posed photographs. An enlargement from an actual film is not suitable because, taking a tiny negative less than an inch wide and enlarging it up to, say, twelve inches by ten, would show up all the little grain marks and produce an unfinished effect. Every production company has its specialist " still men," who devote all their time to taking photographs of this type.

Having, by these methods, attracted an audience, the time has now arrived to present the film on the screen. This is the task of the projectionist. If you would seek him out in a big cinema you would have to climb flight after flight of stairs, until you came to a room right at the very top of the building.

The room is usually called the " box," and in some old-fashioned cinemas it justifies the name, being indeed a poky, unhealthy little place, which is a thorough disgrace to every one concerned. But in modern theatres the projection box is roomy, exceptionally high, airy, well ventilated, and well lit. There are no fumes, nor is there any excessive heat. A team of seven men are able to move about in perfect comfort.

There are three projectors in the room, one a " spare " in case of breakdown, the other two working alternately. Each machine carries a double reel of film that runs for about twenty-two minutes. When the reel which is being exhibited has almost reached its end, a white mark comes into view on the side of the film, and as soon as the operator catches sight of it he quietly calls " Motor " to his colleague in charge of the second machine. The latter starts his motor, so that by the time the first reel has run its course the second machine has reached full speed. The first is switched off, and the second brought



This diagram of a projector stripped of its outer cover shows only the most important parts.

into use so smoothly that the audience does not notice the break, nor does anybody realize that the beam of light streaming across the auditorium has changed its position slightly; that whereas a few moments ago it was coming from the right-hand window, it has now shifted to the left. The human eye retains the image of a picture for a sixteenth of a second after it has disappeared, and expert operators claim that they are able to make the change-over in that time.

The film does not move regularly through the projector, but is pulled through in a series of rapid jerks, twenty-four jerks a second. After each jerk a frame momentarily remains motionless behind the lens, and then it is pulled out of the way to make room for the next. A whirling fan, placed between the film and the lens, cuts off the light from the screen while the film is in motion, and lets it through while the film is still, with the result that the screen is actually in darkness for one-third of the performance!

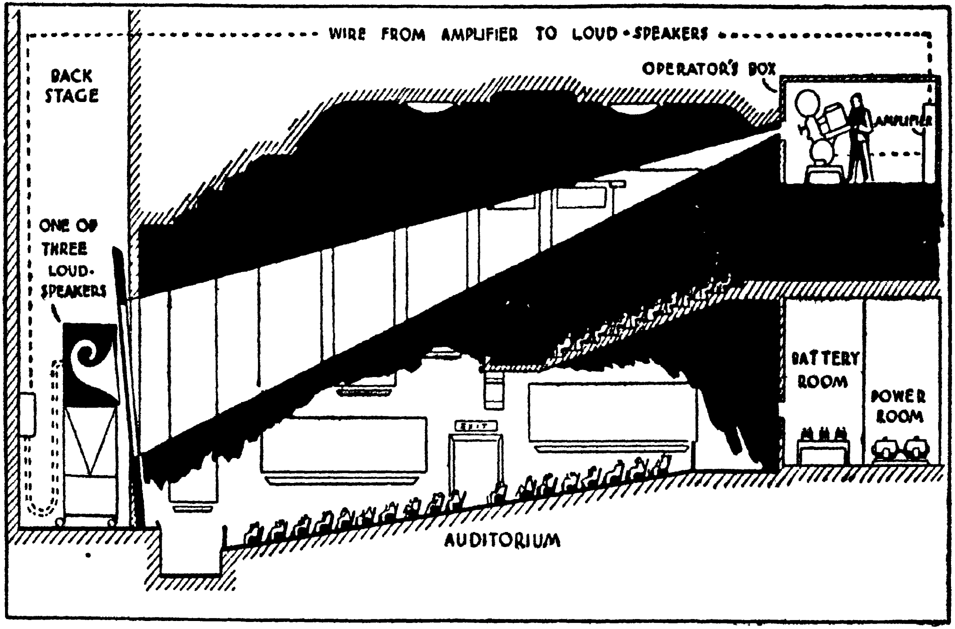
But since the human eye retains the image of a picture for a sixteenth of a second after it has disappeared, as mentioned above, and the projector throws twenty-four successive pictures on the screen in a second, we are still seeing one picture when the next comes along, and this is what gives the idea of continuous movement.

The sound gate on the projector, at which the light shines through the sound track to convert light into electric impulses, is lower down on the machine, nineteen frames away. When the sound track is printed on the mute film in the production company's laboratory, it is not inserted exactly opposite the frame to which it corresponds, but is put nineteen frames nearer the beginning, so that the picture is in the light gate when the corresponding piece of sound track is passing through the sound gate.

The photo-electric cell which receives the light impulses is wired into a circuit which leads right through the building to the loud-speakers behind the screen.

Somewhere in the projection room, usually in the ceiling, there is a loud-speaker through which the operator hears what is going on behind the screen. Otherwise he would hear nothing, for the projection box is soundproof. Up on the wall, between the projectors, is a dialled instrument called a *fader*, which controls the volume of sound, with one side of its dial coloured red and the other white, and each half numbered from zero to fifteen. The two halves correspond to the twin projectors, which are known as the red machine and the white machine.

As he works, the operator keeps beside him a cue-sheet which has been prepared during rehearsals, and contains a rough estimate of the correct fader readings for each section of the picture; but the sound conditions in the theatre vary according to the number of people present, and the state of the atmosphere; the bigger the audience the louder the sound needs to be. So the man who actually supervises the strength of the sound does not work in the projection box at all. He sits somewhere in the audience, usually in a part of the building where hearing is poorest, and communicates with the box by telephone and buzzer. One buzz is a signal to the operator to increase the strength of the sound by turning the



This sectional diagram of a cinema has been simplified to make it clearer. The projection box almost invariably contains three projectors, and from two to seven operators. In many up-to-date cinemas the battery and power rooms are beside the projection box.

" fader " dial-hand up one degree. Two buzzes signal for it to be lowered one degree. And so on.

In the days of silent pictures the operator had very little to worry about once he had set his projector going; he could make himself comfortable and read the paper until the reel neared its end. But that cannot be done nowadays. The operator has to watch over his machines all the time, and one thing he dare not do is let himself get interested in the picture he is showing. An operator in one of the biggest cinemas in London once told me that he had shown the same picture three times a day for a month, and even then his young son, after seeing it once, was able to describe scenes to him that he himself knew nothing about.

All the apparatus must be kept scrupulously clean. The smallest specks of dirt or grease on the sound track would cause a terrific crackling and booming by hindering the passage of light through the film to the photo-electric cell. The impulses are amplified ten million times before they reach the loud speaker; hence the need for the utmost care.

Most cinemas have their scouts among the audience. They are members of the staff who sit haphazardly among the public and note how the picture is being received. If they hear some one say, " This is too silly for words," they make a note of it, and if they hear some one else say, " I like this chap, I wonder why they don't have him more often ? " they make a note of that too. Does the audience laugh unsympathetically at the tender love scene? And does it fail to laugh at all when the fat man treads in a bucket of water, or tumbles down a flight of stairs ? It is very important that the manager should know all these things if he is to keep himself out of the bankruptcy court, so he studies the reports and bears them in mind when he next goes to see a trade show.

On an average, 20,000,000 people visit British cinemas every week. They pay a weekly sum of £800,000 into the box offices. It is a colossal task to furnish these millions with a continual flow of films that will appeal to their varied tastes. The supreme aim of every one in the industry, from the scenario writer to the projectionist, is to present the pictures in such a manner that while they are on the screen the audience will forget everything else and believe in them, unconscious of the fact that they have been laboriously created by an army of workers behind the cinema screen.

CHAPTER X

HOW IT ALL BEGAN

WHO invented motion pictures?

There is no complete answer to this question, for the idea of moving pictures and talking pictures is so old that we cannot trace the beginnings of it. Thousands of years ago the Chinese invented their own quaint variety of talking pictures, which is still popular to-day. Marionettes, cut from parchment, and having movable heads and limbs, are operated behind a gauze screen which is lit from the back by oil lamps. A man standing out of sight of the audience supplies the dialogue, and a concealed orchestra a musical accompaniment.

As explained in an earlier chapter, modern moving pictures depend on the fact that if a number of pictures are presented to the human eye in rapid succession, and each picture differs slightly from the last, the illusion of movement is gained. The invention has developed gradually from a number of nursery toys which are chiefly remarkable for their crack-jaw names—the Thaumatrope, the Phenakistoscope, and others.

The simplest of these is the Thaumatrope, which consists of a disc with a picture on each side, one an animal, say, and the other a cage. If the disc is twirled rapidly the animal appears to be inside the cage.

More complicated forms are the Phenakistoscope, the Zoetrope, and the Praxinoscope, all of them devices for watching a rapidly revolving strip of pictures, which have never become more than nursery toys.

It was in 1872 that the greatest single step was taken towards the modern cinema, when an Englishman, Edward Muybridge, set up twenty-four cameras in a row, and arranged that a horse galloping past them broke threads which worked the shutter of each in turn, thus making the first photographic moving picture strip. These pictures were printed on a revolving glass disc, and shown by means of a special magic lantern.

But it is not Muybridge who is regarded as the father of motion pictures. Although he received practically no recognition during his lifetime, we now know that the man who did most to pave the way for films was William Friese-Greene, a photographer of Piccadilly, London. He is buried in Highgate Cemetery, and the monument over his grave bears this inscription :

WILLIAM FRIESE-GREENE
The Inventor of Kinematography
His Genius bestowed upon Humanity
The Boon of Commercial Kinematography
Of which he was the first inventor and patentee

Friese-Greene realized that progress was impossible until some way had been found of taking as many pictures as were required at a rapid rate in a single camera, instead of using Muybridge's unwieldy device of a whole row of cameras.

At first he used rolls of sensitized paper, soaked with castor oil to make them transparent, and obtained his first successful pictures, showing a street scene in Brighton, in 1888; but the paper was not really suitable, because it broke too easily. Then he decided to experiment with celluloid. George Eastman, the American of Kodak fame, had already invented a roll film for cameras, but as Friese-Greene was unable to get such material ready prepared, he set about making his own. He had to roll it through a mangle until he got it thin enough. While he was preparing it he got the idea of having perforated edges to the strip, and patented the idea, but gave it up in his later experiments—a curious thing, for to-day the perforated edge is indispensable to the film.

With his home-made film in his camera he went to Hyde Park in January 1889, and took the first moving picture ever made on celluloid. A section of it may still be seen in the Science Museum at South Kensington. When he first projected his Hyde Park film in his Brooke Street laboratory, he became so excited that he rushed out into the street shouting:

"I've got it! I've got it!"

Catching sight of a policeman, he took him by the arm and dragged him into his laboratory to show him the birth of a new wonder that in a few years was to sweep across the globe, and put fabulous sums of money into many unknown pockets.

He obtained a patent for his ciné-camera on June 21, 1889, and one may say that on that day the cinema, as we know it, was born, for though great strides have been made in many directions since then, the underlying principle has not been altered. Like many other inventors, however, Friese-Greene was destined not to make any money from his invention. Instead, it ruined him. Until he became absorbed in his experiments his photographic business in Piccadilly had been a success, but he sank all his money in his cinematograph, and in a few years he was penniless. Everything was sold up to pay his debts, and into the sale went his first ciné-camera, a priceless relic. No one knows what became of it.

After that poor Friese-Greene sank into obscurity. Another Englishman, Robert Paul, invented a projector in 1895; other men, with much less inventive genius but with sharper business sense, adapted Friese-Greene's camera, and the film industry began to grow and grow while the man who had made it all possible was forgotten.

Then, on May 5, 1921, Friese-Greene appeared once more in circumstances that were as dramatic and tragic as anything seen on the screen.

At that time the British film industry was in an appalling plight, and a meeting of the magnates of the industry was held at the Connaught Rooms, in London, with Lord Beaverbrook as chairman, to discuss the situation. Towards the end of the meeting an old man, who had hitherto remained unnoticed at the back of the hall, rose and asked hesitatingly to be allowed to say a few words. With deep emotion he begged those present to settle their differences and set the British film industry on its feet.

A few minutes later William Friese-Greene—for the old man was he—collapsed and died.

British films continued to languish for several years, however, and it was not until the American company of Warner Brothers suddenly flung their bombshell by producing talking pictures, in 1929, that British firms made a determined effort. Since then the advance has been rapid.

Talking films were not new in 1929. Many years earlier, Edison, acting on a suggestion made by Friese-Greene, devised a method of synchronizing his phonograph with a film. In 1907 Eugene Lauste made a sound-film with the sound track actually on the film, in the modern manner, but nobody took up his patent, and after being unexploited for sixteen years it was allowed to lapse, and nothing more was done in Europe until Hollywood had given a lead.

But the Americans were not the pioneers of the silent film, for in the early years of the present century film-making was entirely in the hands of European companies, with Robert Paul the most important maker. Hollywood was undreamed of, and American showmen looked upon moving pictures as a craze that would die out after a little while; they showed their pictures in peep-shows and in converted shops, charging five and ten cents for admission. Production methods were so crude that even when the reels were first made they were difficult to see, and by the time they crossed the Atlantic, a little the worse for wear, they were so foggy, and flickered so much, that it was scarcely possible to distinguish anything at all.

Then something happened which changed the whole cinema world. One afternoon, early in the century, a little man who was a clerk in a clothier's business in Oskosh, Winsconsin, arrived in Chicago to see the sights. His name was Carl Laemmle. He wandered into a little place called Hale's Tours, where crude moving pictures, taken from the window of a train, were being shown in a room with a floor that rocked in order to give the audience the sensation of being in a railway carriage!

Laemmle's imagination was captured at once; he visualized vast possibilities in those smudgy pictures. On his way out he asked the ticket seller if the show was doing good business, and being told that it was, he hurried back to Oskosh, bursting with enthusiasm. He told his wife that he had decided to enter a new business and needed fifteen hundred dollars; the money was scraped together, and Laemmle went straight back to Chicago and bought the show. His first move was to do away with the rocking floor!

As business increased he opened up other shows in different parts of the country. Then, in 1909, a business war with film distributors and producers developed. They wanted to buy Laemmle out. Instead, he determined to make his own pictures. Those were hectic days. Money was none too plentiful, he was opposed by powerful interests, and he scarcely knew from day to day whether he was going to smash. But fortune favoured him. One afternoon a lady named Mrs. Smith walked into his office, bringing her three children, Jack, Lottie, and Gladys. Laemmle engaged them all at an inclusive salary of £30 a week, and Gladys Smith, a girl of about eighteen, proved a wonderful find. She rapidly rose to be the most famous actress in moving pictures. The world knows her as Mary Pickford.

Thereafter Laemmle went from strength to strength. He found a market for his pictures in Europe, and the increased revenue thus obtained probably saved him from extinction. In 1912 the Universal Film Corporation was formed with Laemmle as president. In 1915 they opened studios in Hollywood, which film producers were then just beginning to discover. The climate was found to be ideal, and the country round about so varied that it provided suitable locations for almost any kind of picture, for within easy reach there are lakes, woods, deserts, Pacific islands, jungle, grasslands, rivers, and mountains. It has been said that the Hollywood producer has the whole world at his doorstep, and this is very nearly true.

In 1915, however, the district was practically unknown. Where the renowned Hollywood Boulevard is to-day a single tramway track ran through fig orchards and orange groves. The country was dotted with fruit farms, chickens and cows wandered about the rough roads, and it is said that the first films made in the district were produced in the backyard of a Chinese laundry in Los Angeles.

The story of Laemmle's struggle and rise to power are typical of several others. There was, for example, William Fox, who began as a clothes presser in New York, entered the film industry, built up the Fox Film Corporation, and " sold out " for a million pounds.

Another was Jesse Lasky, who was first a reporter on a San Francisco newspaper, and next joined a gold rush to Alaska. Returning, he became the leader of a dance band, and then went on the stage, until he turned his attention to films in 1914, and founded the Jesse Lasky Feature Player Company, which has developed into the Paramount-Publix Corporation.

Until 1912 Britain, France, and Italy had been supplying America with nearly all its films, because very few were made there; but in the next sixteen years American productions fairly swept the world, until all the pessimists in Britain were saying, "We can never expect to compete with Hollywood. They've got all the experts, all the players, all the money, all the finest organizations—everything."

But there were one or two men who never lost faith in British productions. Perhaps the most far-sighted of all was John Maxwell, who began his career as a solicitor in Scotland. Quick to see the possibilities in the young film industry, he determined to enter it, and did so by buying a cinema. The project prospered, and he bought other theatres. As his business grew he determined to launch out in a new line, and established Wardour Films to distribute pictures, following the methods of his contemporaries in America. Like them, too, he presently decided that it was to his advantage to produce his own films, and he founded British National Films to make pictures at Elstree.

This company was the forerunner of British International Pictures, which is probably the largest unit in the country. The studios, which were reconstructed in 1928, stand on a site covering forty acres, and the three huge blocks of sound stages are capable of carrying nine productions at the same time.

John Maxwell's faith in British films has been fully justified. How well they have fought back from the dismal position they occupied a few years ago is best illustrated by the significant fact that in 1932, the year of the great commercial slump, only five big companies in the world made a profit, one German, two American—and two British. Moreover, though British films were for so long such clumsy productions, and some of them still are, the best show now a technical mastery which Hollywood rarely surpasses; and though the British industry has yet to produce a genius such as Charlie Chaplin, an idea as original as Walt Disney's cartoons, players so universally popular as Douglas Fairbanks, Mary Pickford, and other Hollywood stars, or films so brilliantly directed and photographed as the best from France, Germany, and Sweden, yet it is plain that our film companies are now firmly established and steadily forging ahead.

THE END

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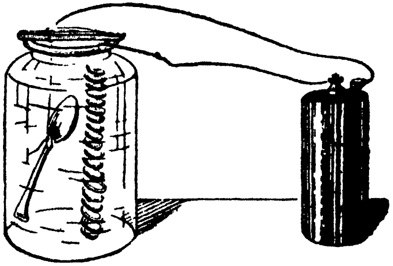

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